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CAPITAL IMPROVEMENT PROGRAM

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, as amended, as passed through the Metropolitan Transportation Commission.

The contents of this report reflect the views of BART, which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the original views or policy of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

All projects discussed are subject to state and federal environmental review as required by law. Specific projects and project funding are subject to approval by the District's Board of Directors and the availability of funding from BART and outside funding sources. Projects that do not yet satisfy these requirements are considered to be proposed projects.

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SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

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INTRODUCTION

TODAY....LOOKING TO THE FUTURE

After operating rail service for 16 years, BART is on the brink of a major service expansion. What passengers have seen already are new transit vehicles and a third track that runs through downtown Oakland. What passengers will be seeing over the next couple of years are more new transit vehicles, more trains operating at shorter intervals and more parking at BART stations. Other improvements that will benefit passengers but will be "invisible" to the public include implementation of the new train control system, enhanced traction power capability and additional facilities for storage and repair of transit vehicles. The most dramatic change will occur within the next one to two years when construction is scheduled to begin on the first of four proposed rail extensions. In total, BART proposes to add over 32 miles of extensions to the existing 72-mile system.

The 1989 Five-Year Capital Improvement Program (CIP) is BART's blueprint for expanding service within the existing system and a preview of proposed future rail extensions. The document that follows describes the financial plan for the overall capital improvement program and provides a description of each component in the program.

CAPITAL PLANNING PROCESS

The preparation of the Five-Year Capital Plan is the final development stage of the BART capital program. The initial stages involve an ongoing internal review of new capital projects. The Project Review Board (PRB) meets on a monthly basis to review new capital projects. Part of the project review process includes identifying potential fund sources for the project. Approved projects are either funded from BART reserves or require grant applications for funding from outside sources. Once a year, PRB prepares an unfunded capital project list which serves as the basis for BART's submission to the Metropolitan Transportation Commission (MTC) capital priorities process. After the PRB approves this list, it is presented to the BART Board of Directors for approval before its submission to MTC. The regional Transportation Improvement Plan (TIP) is derived from all regional operators' submissions to the MTC capital priorities process. The BART Five-Year Capital Plan incorporates all BART projects that are in the regional TIP as well as projects funded from BART sources that do not appear in the TIP.

PROGRAM OVERVIEW

The CIP is made up of two chapters. Chapter One is the Financial Plan which discusses the strategy for funding the capital program and describes the proposed funding sources. The Extensions Program remains the focus of the capital program because it represents the greater funding challenge, requires the most legislative support and accounts for approximately 61% of the total program. The Extensions Program is included as part of the total capital program and is also broken out as a separate program area showing greater detail because of its size and complexity. Chapter One also presents the status of BART reserves.

Chapter Two is the Program Description. This chapter breaks out each of the four program areas and briefly describes them. In addition, this chapter lists all of the projects that comprise each program area and shows the funding status

of each project. A description of each project in the Capacity Expansion Program and Basic System Program is contained in the Appendix.

CHALLENGES....THE AUTOMOBILE AND FUNDING

For the sixth straight year, the annual Bay Area Council Poll shows that the number one concern for the majority of Bay Area residents is transportation. With freeways exceeding capacity and the reluctance of cities to support freeway widening projects, one obvious alternative is expanded public transportation capability. The glut of cars on Bay Area freeways is caused by many factors including growth and the declining price of gasoline. In developing a capital improvement program, BART is ever mindful of the need to provide service that is more attractive than driving an automobile.

Consistent with the concern expressed in the Bay Area Council Poll, the regional and local electorate have passed measures to increase the sales tax by one half cent in three counties and to increase tolls on Bay Area bridges to fund various transportation and highway projects. Continued support from federal and state funding agencies and the electorate is vital for the successful implementation of the BART capital program. The challenge is to continue to expand this support to the point where financing for the total Capital Improvement Program is in place.

CHAPTER I

FINANCIAL PLAN

CAPITAL PROGRAM SUMMARY

BART's current $2.9 billion Capital Improvement Program has experienced considerable growth in the past year. Of the four capital program areas, Extensions, Access, Capacity Expansion and Basic System, most of the growth results from a number of new projects that support the Basic System and the addition of the proposed Colma and San Francisco Airport Extensions. Unlike older systems on the East Coast which have experienced major system rehabilitation, BART is faced with the first major overhaul of many components that support the Basic System. The new Basic System projects are largely unfunded and represent a new funding challenge.

The Extensions Program is made up of those projects that expand the basic rail system beyond the existing 72-mile system. The Access Program is composed of projects designed to improve patron traffic to and from the station areas as well as within the stations. The Capacity Expansion Program is designed to increase and enhance train capacity of the current system. The Basic System Program consists of replacement projects that support the basic infrastructure and other wayside components.

Projects that are programmed with BART reserves are considered **funded** projects because the funds are **available**. In the case of some reserves, specific Board approval is required before expenditures can be made. Projects that are **programmed** with funds from outside sources are considered **unfunded** projects until such time as there has been a grant award by the appropriate funding agency. **Earmarked** funds indicate a **commitment** by an outside funding source to support a portion of the Extensions Program.

FINANCING THE CAPITAL PROGRAM

The cost for the total CIP is $2.9 billion. Individual costs for each program within the CIP are shown in Figure 1. Figure 2 shows the overall funding status of the CIP. BART contributions to the CIP total $468 million. The Capacity Expansion Program is the only program area that is almost 100% funded while the Extensions and Basic System Programs make up the majority of the unfunded CIP. Most of the unfunded portion of the Basic System Program consists of the new transit vehicle acquisition to support basic operations once Phase I Extensions have been brought on-line.

The Extensions program is approximately 61% of the total CIP. Figure 3 shows the break out of costs by extension and Figure 4 shows the funding mix for the total Extensions Program. The costs shown are based on Phase I Extensions and Phase II planning and right-of-way acquisition. Phase I Extensions include two-station additions from Fremont, Concord and Bay Fair Stations; and a rail extension from Daly City Station to the San Francisco Airport which includes the one-station Colma Extension.

The primary funding source for the funded portion of the Access Program is the BART 1985 Revenue Vehicle Bond Issue. Approximately $77 million of the unfunded portion of the Access Program is programmed with UMTA funds. The Capacity Expansion Program was funded from a combination of federal, state, local and BART funds. Approximately 55% of the funding came from federal sources. BART reserves account for 26% of the funding for the program. The funded portion of the Basic System Program comes from BART sources and UMTA funds. The new revenue

vehicle acquisition, at an approximate cost of $218 million, represents the largest segment of the unfunded portion of the Basic System Program. This acquisition of 145 new revenue vehicles beginning in the mid 1990's is a critical component of service delivery as Phase I Extensions are brought on-line.

EXTENSIONS FINANCING....INNOVATIONS

The most complex financing scheme involves the Extensions Program. Phase I Extensions are to be funded from a combination of BART, regional, UMTA and State sources including the proceeds of half-cent sales tax measures passed by the voters in three counties. In the past two years, half-cent sales tax measures have passed in Alameda (1986), San Mateo (1988) and Contra Costa (1988) Counties in support of transportation projects. In all three instances, the BART Extensions Program has benefitted from the passage of these measures. Although the San Mateo County measure was specifically in support of Caltrain projects, passage of this measure gave the County the added flexibility to provide support for a BART rail extension in San Mateo County. In Alameda County, $170 million is presently programmed for the Dublin-Pleasanton and the Irvington-Warm Springs Extensions. In Contra Costa County, the proceeds of the half-cent sales tax measure will fund $178 million of the Pittsburg-Antioch Extension. These amounts are all in current dollars and are assumed to escalate.

In addition to these county measures, voters passed a regional measure in 1988 to increase the tolls on Bay Area bridges to fund a variety of bridge improvements and public transit projects. Approximately seven million dollars per year of this toll increase will go toward BART Phase I East Bay Extensions.

The foundation for the current Phase I Extensions Program financial plan is the agreement that was adopted by both the BART Board of Directors and the San Mateo County Transit District (SamTrans) in June 1988. This agreement defined the terms under which BART would provide rail service to Colma and the San Francisco Airport in San Mateo County. San Mateo County is currently outside the existing three-county BART District. The Principles of Agreement specify that the cost of the San Francisco Airport Extension be 75% financed with federal funds with 25% matching funds from SamTrans. In addition, Samtrans agreed to a $200 million payment to BART which will be available for Phase I East Bay extensions projects. This $200 million contribution from SamTrans was the catalyst for development of the financing plan for Phase I East Bay extensions.

BART RESERVES PROJECTIONS

Figure 5 is a summary of BART reserves. This table illustrates the five-year cash draw-down against the current cash balances of all BART reserves. The total available funding, which includes accumulated interest over the five-year period, is approximately $313 million. Approximately $267 million in programmed expenditures leaves a balance of nearly $46 million. This balance is considered a necessary capital contingency in support of the total capital program, and in support of expected inflation on the Extensions Program.

TODAY....LOOKING TO THE FUTURE

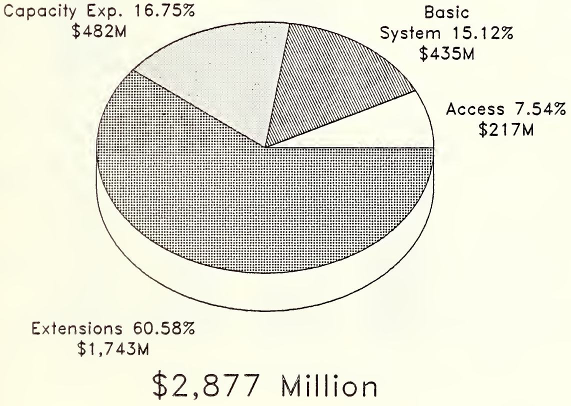
While the Extensions Program is the object of considerable capital investment, the needs of the Basic System are becoming significant. The primary identifiable funding source for the Basic System Program is UMTA funds. However, this need to fund the rehabilitation of existing system components comes at a time when federal funds continue to decrease substantially each year.

Bay Area residents recognize the benefits of expanding the rapid transit system and at the same time expect reliable and efficient service today. The challenge for the next five years and beyond is to insure that BART is able to expand into a system that will provide greater capacity to larger numbers of passengers throughout the Bay Area.

The greater challenge will be to insure that adequate funding is available to support BART's capital program. In the past year, BART has successfully negotiated an agreement with SamTrans that has taken Phase I Extensions beyond the planning stage and a step closer to realization. Working with MTC and other transit operators in the region, BART has helped formulate a regional new starts financial plan.

FIGURE 1

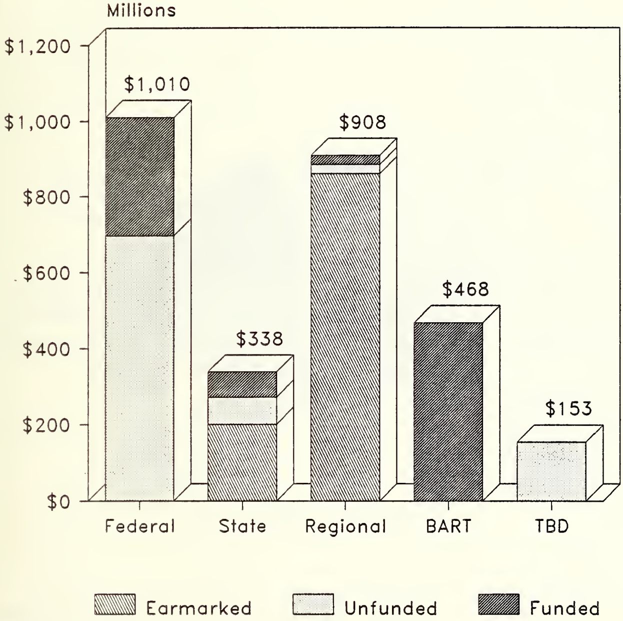
BART Capital Program
Funding Uses*
(Current Dollars)



*Proposed.

FIGURE 2

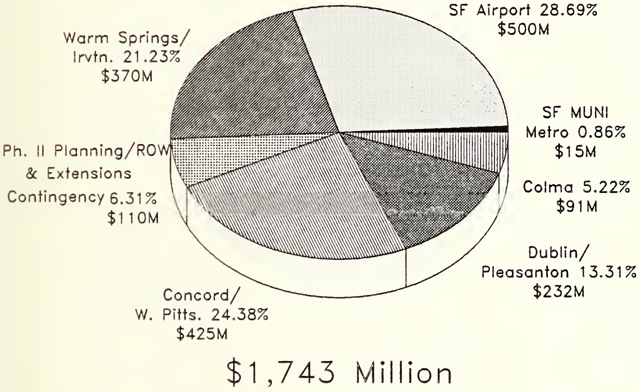
BART Capital Program
Funding Sources
(Current Dollars)



TBD: To Be Determined
- Funded: Funds Available for Expenditure
- Earmarked: Commitment by Outside Funding Source
- Unfunded: Funds not Available for Expenditure

FIGURE 3

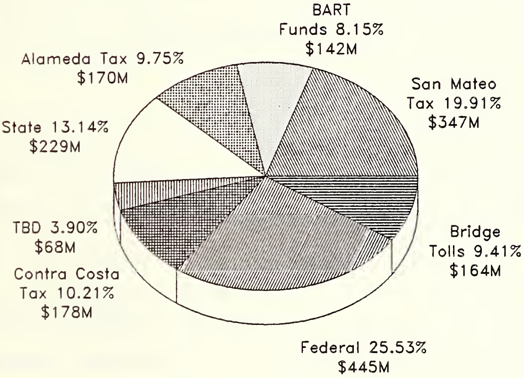
BART Extensions Program
Funding Uses*
(Current Dollars)



*Proposed.

FIGURE 4

BART Extensions Program
Funding Sources *
(Current Dollars)



$1,743 Million

*This figure includes funded, unfunded and earmarked sources. See Figure 2 for definitions.

SUMMARY OF BART RESERVE CASH BALANCES

(Estimate in $000's for 1994)

	Line Item	Cumulative Total
Cash Balances (Projected to June 30, 1989)		
- General Construction (Fund 01)*	18,000	196,160
- Basic System Completion (Fund 01)*	1,350	
- System Improvement Reserve	1,900	
- Revenue Bond Construction Fund	160,000	
- Interest Transfer Fund	7,000	
- DC Reserve/Full Funding Agmt.	260	
- Multi-Year Capital Allocations	2,150	
- Extensions Right-of-Way Reserve	50	
- Improvement Allowance	5,450	
Capital Allocations from Operating Budget		62,961
C-Car Safe Harbor Leasing		19,205
Interest		34,633
Total Available Funding		312,959
Less Programmed Expenditures		
BART Obligations, Local Shares, and Costs Unavailable from Grant Sources		(266,810)
Contingency Funds (Balance)		
- DC Full Funding Grant Agreement		(260)
- Project Contingency		(15,889)
- Extensions Inflation Contingency		(30,000)
Total Programmed Expenditures		(312,959)

---

* Interest accrues to the GO Bond Fund and is available in the five year period; however, reserve balances do not change from year to year to reflect this since the interest does not actually accrue to the specific reserve.

CHAPTER II

PROGRAM DESCRIPTION

EXTENSIONS.....WHERE THE MONEY COMES FROM, WHERE IT GOES

Funding

From a funding standpoint, the Extensions Program is the most complicated and the greatest challenge. Figure 6 identifies the funding sources and the status of the program. As this figures shows, each extension is programmed with its own particular mix of funding. To date, BART has expended and BART funds to acquire rights-of-way, conduct environmental studies and, in some instances, initiate preliminary engineering and design.

A joint effort among BART, MTC and SamTrans is underway to earmark federal funds for the West Bay Extensions which include Colma and San Francisco Airport. Federal funds have been identified in the regional new starts financial plan as the potential primary funding source for the West Bay Extensions. State funds in the amount of $229 million have been committed to BART extensions by the California Transportation Commission (CTC) in a 1988 resolution and prior actions. By voter approval, county funds and bridge tolls have likewise been committed to BART extensions. BART is contributing $142 million to extensions in cash and property for Phase I Construction and Phase II Planning and Rights-of-Way acquisition. Also included in the $142 million is a $15 million contribution to the Muni Metro project and $30 million to be applied toward inflation of the total Extensions Program. A successful effort to earmark federal funding would secure the last critical piece in the extensions funding puzzle.

Chapter One briefly discussed the importance of the BART/SamTrans agreement to the Extensions Program. In this agreement, SamTrans agreed to make a $200 million contribution which will be available for East Bay extensions. The total Extensions Program is contingent upon the successful funding of the West Bay extensions with federal funds and the SamTrans payment of $200 million to BART. If successful, and other assumptions are realized, the federal earmark will complete the funding for the entire Phase I Extensions Program.

Project Status

As discussed above, Figure 6 shows the status of Phase I Extensions. This figure describes how many stations per extension will be built, how many miles are in the extension, identification of funding sources, and a brief description of the status of each project. Figure 7 shows the cost by task for each extension project and the estimated amount that has been expended through June 30, 1989.

The state final environmental impact report (FEIR) for North Concord-West Pittsburg has been completed, and the FEIR for Dublin-Pleasanton is scheduled for completion in the Spring of 1989. Preliminary engineering and design is underway for both projects. The draft state environmental impact report (DEIR) and preliminary engineering for Irvington-Warm Springs are scheduled to begin in Spring 1989.

The West Bay Extensions are programmed with federal sources. Therefore, these projects must satisfy federal environmental requirements. The Colma Station DEIS/DEIR was completed in December 1988 and the FEIR/FEIS is scheduled for completion in 1989. The AA/DEIS/DEIR for the San Francisco Airport Extension is scheduled to begin in Spring 1989.

Construction for the Dublin-Pleasanton and Colma Extensions is scheduled to start in 1991. Bay Area residents will get a first look at their investment in the Extensions Program as construction begins on these projects. The North Concord-West Pittsburg and Irvington-Warm Springs extensions are also scheduled to start construction in 1991.

The maps that follow show the proposed rights-of-way for Phase I Extensions. These routes are tentative until preliminary engineering is completed for each project.

FIGURE 6

EXTENSIONS STATUS
PHASE I PROJECTS

	STATIONS	MILES	FUNDING SOURCES	PROJECT STATUS
North Concord - West Pittsburg	2	7.8	State Bridge Tolls Contra Costa County SamTrans BART	FEIR Completed (11/88) Preliminary Engineering/ Design Underway Constructed by 1997
Dublin - Pleasanton	2	12	State Bridge Tolls Alameda County BART	DEIR Underway Preliminary Engineering/ Design Underway Constructed by 1995
Irvington - Warm Springs	2	5.4	State Bridge Tolls SamTrans BART	DEIR to Begin Spring 1989 Constructed by 1997
S. F. Muni Metro Extension	TBD	TBD	BART	S. F. Project Lead
Colma Station	1	0.9	UMTA SamTrans State	DEIR/DEIS Completed 12/88 FEIR/FEIS to begin Spring 1989 Constructed by 1995
San Francisco Airport	3	6.2	UMTA SamTrans State	AA/DEIS/DEIR to Begin Spring 1989 Constructed by 2000
TOTAL	10	32.3		

20-Apr-89

FIGURE 7

EXTENSIONS FINANCE PLAN - BY CORRIDOR & TASK
PHASE I &
PHASE II PLANNING/ROW

$ X 000

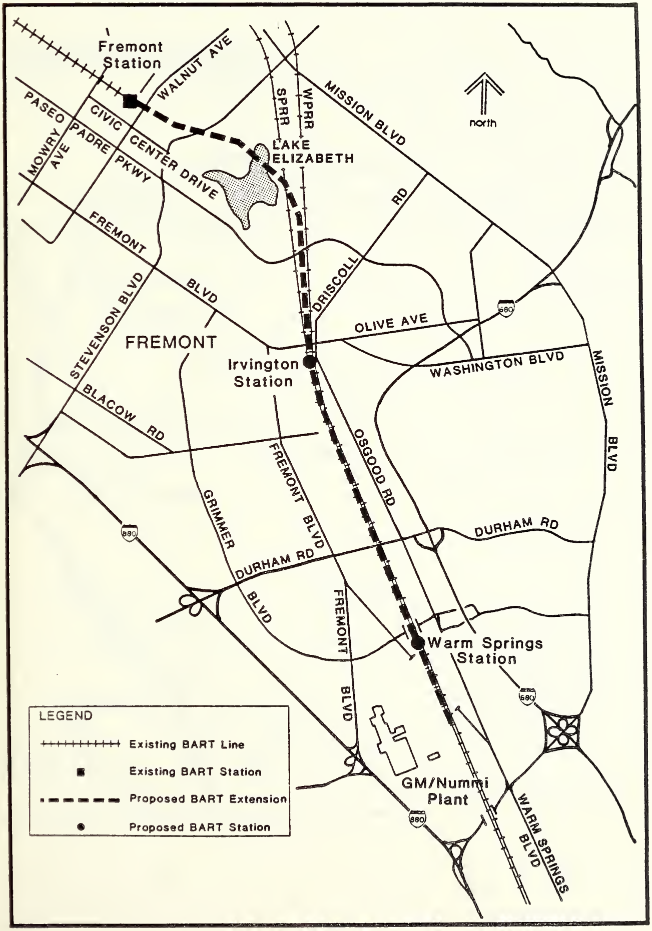
	PE & ENGINEERING	ROW & AGREEMENTS	PROCUREMENT & CONSTRUCTION	TOTAL		AMOUNT EXPENDED THROUGH JUNE 30, 1989
N. CONCORD - W. PITTSBURG	$64,226	$20,870	$339,904	$425,000		$13,770
IRVINGTON - WARM SPRINGS	$55,553	$22,200	$292,247	$370,000		$20,300
DUBLIN - PLEASANTON	$32,022	$16,260	$183,318	$231,600		$15,720
COLMA	$12,060	$1,590	$76,850	$90,500		$200
SAN FRANCISCO AIRPORT	$78,700	$27,600	$393,700	$500,000		$0
SAN FRANCISCO MUNI				$15,000		$0
PHASE II PLANNING & ROW				$81,099		$7,928
SUBTOTAL	$242,561	$88,520	$1,286,019	$1,713,199		$57,918
BART CONTRIBUTION TO EXTENSIONS INFLATION CONTINGENCY				$30,000		
GRAND TOTAL	$242,561	$88,520	$1,286,019	$1,743,199	$0	$57,918

CURRENT DOLLARS

21-Apr-89

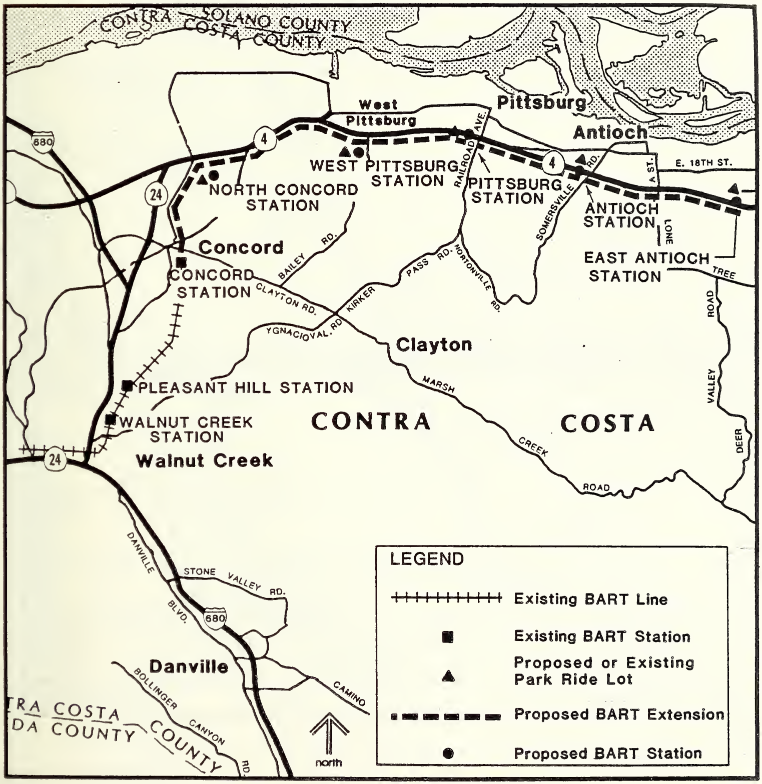
WARM SPRINGS EXTENSION

Inside Current District Phase I



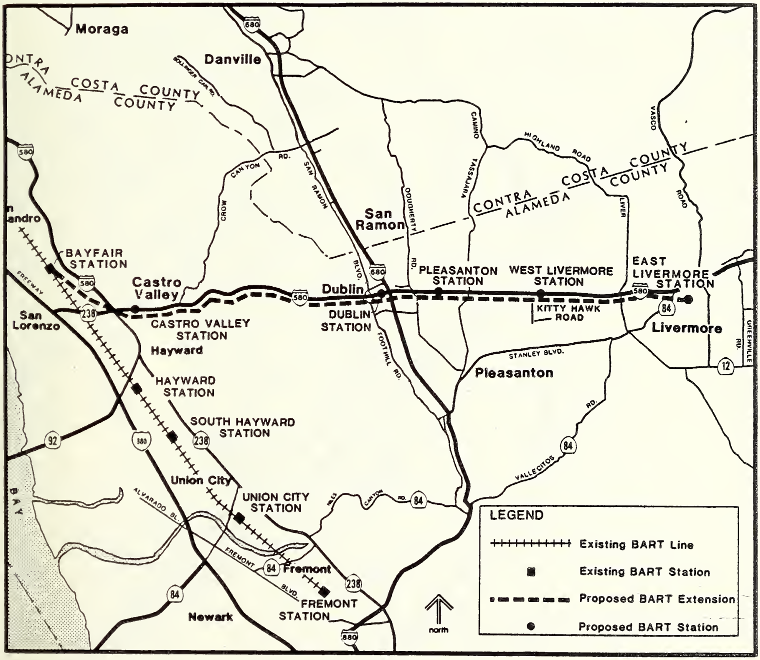
BART PITTSBURG – ANTIOCH EXTENSION

Inside Current District Phases I and II

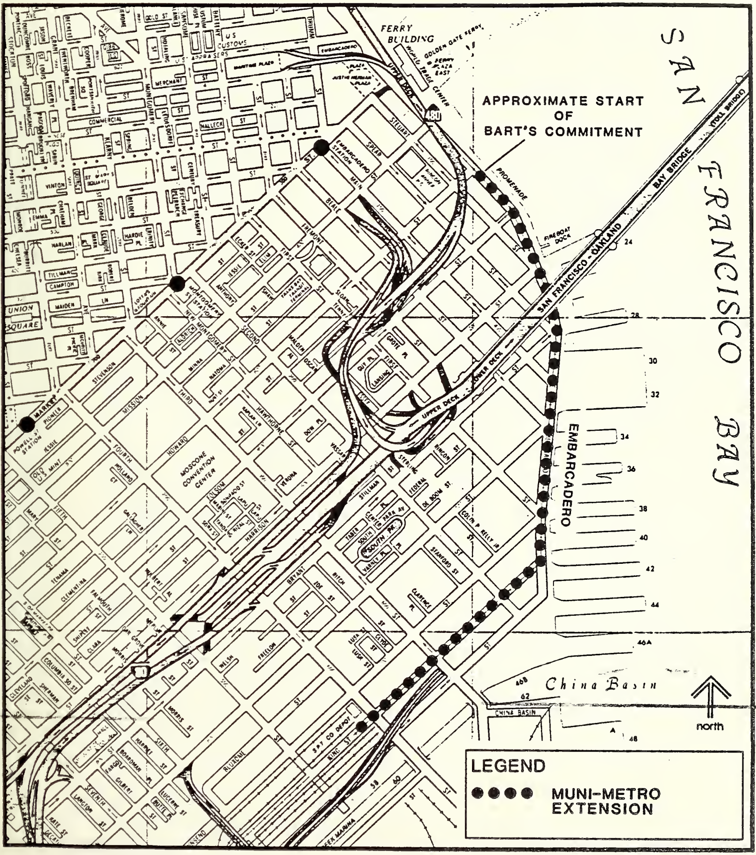


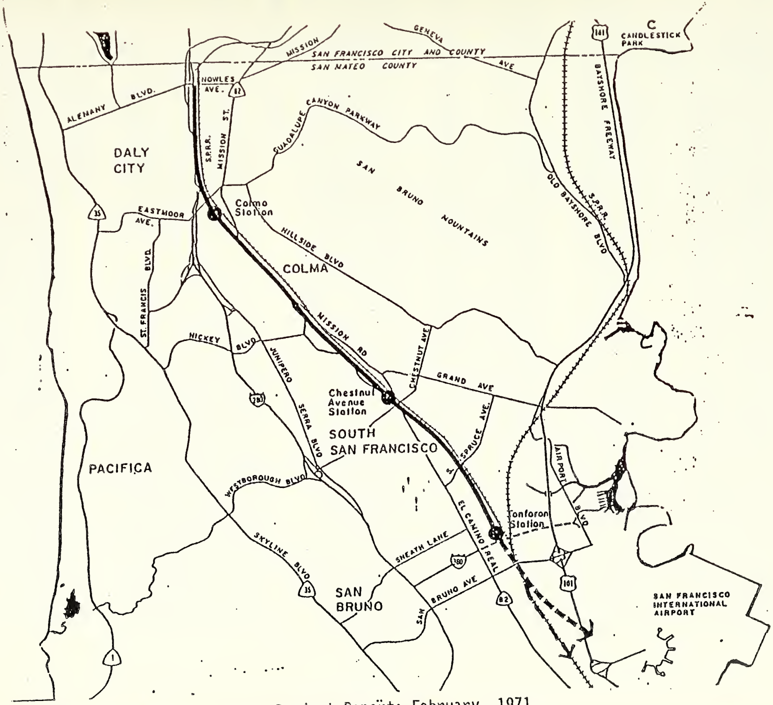
LIVERMORE–PLEASANTON EXTENSION

Inside Current District Phase I and II



SAN FRANCISCO COMMITMENT
(Muni-Metro Extension)
Inside Current District Phase I





Source: San Francisco Airport Access Project Report; February, 1971

STATION ACCESS PROJECTS

A key element to achieving success in the implementation of the Capacity Expansion Program is providing sufficient patron parking at BART stations. Figure 8 summarizes the BART Access Program and its funding status. There are over 27,000 existing patron parking spaces throughout the District. This inventory of parking spaces includes parking expansion projects that have provided approximately 7,000 additional spaces over the past several years as shown in Figure 9.

The current systemwide parking shortage is estimated at 11,700 spaces. The current parking shortage is estimated to cost the District over $10 million per year in lost revenue due to inaccessibility. After the Capacity Expansion Program is implemented and additional rail capacity is available, the revenue loss will be even greater.

BART proposes to add 10,583 more spaces by the end of the five-year period. When all planned parking projects are completed, including projects beyond the five-year period, there will be a total of 41,808 parking spaces systemwide.

The total cost of the Access Program is approximately $218 million. Of that amount, $57 is funded, $77 million is programmed for funding from identified fund sources, and $84 million is unfunded and no fund source has been identified.

Additional parking will be necessary to maximize rail-revenue and patron convenience even as bus and carpool access increases. In future years, BART anticipates substantially higher numbers of patrons arriving at stations by all modes, including autos. BART also anticipates that most of the BART patrons who will utilize expanded parking facilities will be new BART riders drawn from regional freeway commutes and other congested auto arteries.

Pleasant Hill Station

After many years of negotiating with the State Department of Transportation over funding, environmental review and design, BART is set to break ground in Fall 1989 for a multi-level parking facility at the Pleasant Hill Station. This will be the first multi-level parking facility to be constructed in the East Bay and the only one built since the construction of the Daly City Station parking facility in 1976. This project will provide approximately 1200 additional parking spaces at Pleasant Hill. The possibility of future joint development at this site has been taken into consideration in the project design.

Access Improvements Projects

In cooperation with AC Transit and the Central Contra Costa Transit Authority, BART has targeted five BART station sites for improved bus and automobile access projects. The five station sites are Fruitvale, Hayward, El Cerrito del Norte, Walnut Creek and Concord. The proposed projects will replace existing bus-interface facilities and patron parking on neighborhood streets. Where possible, BART will coordinate construction of parking facilities and transit improvements with the need to maintain, repair, and rehabilitate existing access facilities.

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Three of these projects support AC Transit capital plans to restructure routes which will bring more buses to BART stations. Station transfer facilities are currently inadequate to meet these increased needs. In addition, BART and AC Transit are cooperating in the development of transfer centers at eleven other BART stations. CCCTA likewise anticipates a need for improved transfer facilities in the future.

The station access projects include transit coordination improvements such as sheltered walkways and waiting areas for bus transfers; improved signage and transit information; adequate bus bays for increased numbers of simultaneous off-loadings and boarding; and fast, safe station area circulation for these buses. These projects will provide more convenient and attractive service for existing and future BART/bus patrons. A drawing of each of the five joint projects follows Figure 9.

FIGURE 8

STATION ACCESS PROGRAM OVERVIEW
(PARKING COMPONENT)

FMS#	STATION ACCESS PROJECTS	CURRENT PARKING SPACES	5-YR PARKING SPACES	PARKING BEYOND 5-YEARS	TOTAL PLANNED PARKING	SURFACE LOT	FACILITY	LAND PURCHASE REQUIRED	FILLED DURING AM PEAK	FUNDING STATUS***
0--&	PARKING PRODUCTIVITY IMPROVEMENTS	SEE NOTE (1)								F
01EE	LAKE MERRITT STATION ACCESS IMPVTS	190		400	590		XX		XX	U
01GG	ALAMEDA PARK/RIDE	0		100	100	XX		XX		F
01GH	FRUITVALE ACCESS IMPROVEMENTS	1,025	560		1,585		XX			P
01MH	BAYFAIR STATION ACCESS IMPROVEMENTS	1,761		600	2,361		XX			U
01OF	HAYWARD SURFACE LOT EXPANSION	967	950		1,917	XX		XX		F
01OG	HAYWARD ACCESS IMPROVEMENTS	*	*		0		XX			P
01VG	UNION CITY SURFACE LOT EXPANSION	1,166	300		1,466	XX		XX	XX	F
	ALAMEDA COUNTY LINE SUBTOTALS	5,109	1,810	1,100	8,019					
03EB	ROCKRIDGE STATION ACCESS IMPROVEMENTS	776	500	500	1,776		XX		XX	F
03HG	ORINDA STATION ACCESS IMPROVEMENTS	1,320		500	1,820		XX		XX	U
03JG	LAFAYETTE STATION ACCESS IMPROVEMENTS	1,446		700	2,146		XX		XX	U
03LG	WALNUT CREEK ACCESS IMPROVEMENTS	1,263	1,385		2,648		XX		XX	P
03LJ	WALNUT CREEK SURFACE LOT RESTRIPING	*			*	XX			XX	U
03NE	PLEASANT HILL PARKING FACILITY- EXPAND	1,778	1,393		3,171		XX		XX	F
03NG	PLEASANT HILL PARKING FACILITY-REPLACMNT	*			*		XX		XX	U
03NJ	PLEASANT HILL SURFACE LOT RESTRIPING	*			*	XX			XX	F
03SH	CONCORD RPL. PKG. & ADDITIONAL CAPACITY	1,912	1,735		3,647		XX		XX	F
03SN	CONCORD ACCESS IMPROVEMENTS	*			*		XX		XX	P
04RA	BRENTWOOD PARK/RIDE	0	100		100	XX				P
	CONCORD LINE SUBTOTALS	8,495	5,113	1,700	15,308					
05KH	EL CERRITO DEL NORTE PARKING FACILITY	1,607	1,960		3,567		XX		XX	F
05KI	EL CERRITO DEL NORTE ACCESS IMPROVEMENTS	*			*				XX	P
07GH	MACARTHUR STATION ACCESS IMPROVEMENTS	609		640	1,249		XX		XX	U
	RICHMOND LINE SUBTOTALS	2,216	1,960	640	4,816					
11EH	WEST OAKLAND SURFACE LOT EXPANSION	403	1,100		1,503	XX			XX	U
11EG	WEST OAKLAND STATION PKG EXPANSION	*			*				XX	U
11UB	DALY CITY INTERMODAL**									
	SAN FRANCISCO LINE SUBTOTALS	403	1,100	0	1,503					
	TOTALS	16,223	9,983	3,440	29,646					
	TOTAL STATIONS WITH NO NEW PROJECTS	10,559	0	0	10,559					
	TOTAL EXTENSION STATION PARK/RIDES	1,003	600	0	1,603	XX		XX		
	GRAND TOTALS	27,785	10,583	3,440	41,808					

NOTE 1: PROJECT INVOLVES RESTRIPING VARIOUS STATION PARKING LOTS - 10-20% PROJECTED PARKING INCREASE.

* MULTIPLE PROJECTS PLANNED - CURRENT AND PROJECTED TOTAL PARKING SPACES ARE SHOWN ONLY ONCE.

** ENHANCES STATION ACCESS FOR BUSES; EXPANDS PATRON ACCESS AND TICKETING AMENITIES.

*** F - FUNDED AMOUNT FUNDED: $57 MILLION
P - PROGRAMMED, FUNDS NOT YET APPROVED AMOUNT PROGRAMMED: $77 MILLION
U - FUNDING NOT IDENTIFIED AMOUNT OF UNIDENTIFIED FUNDS: $84 MILLION

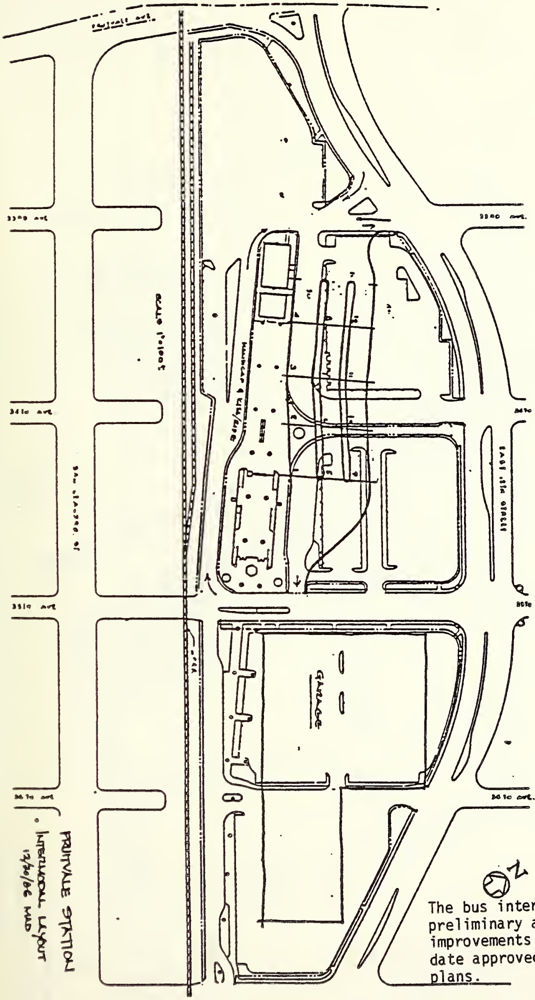
21-Apr-89

FIGURE 9

PARKING PROJECT HISTORY

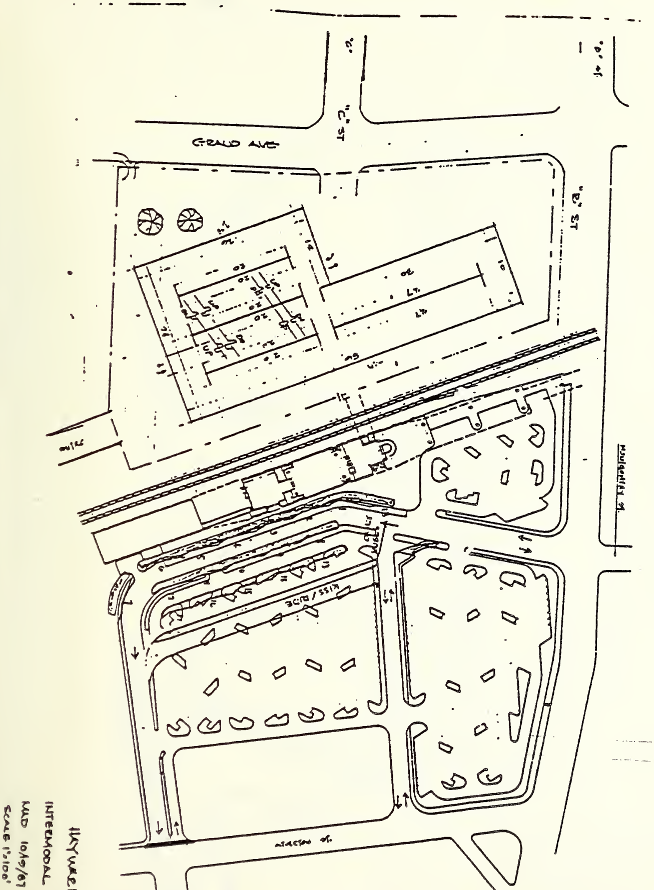
COMPLETED PROJECTS

STATION NAME	FMS #	PROJECT DESCRIPTION	SPACES
FREMONT	01XD	FREMONT TEMP IMPS/CALTRANS LOT (II)	685
FREMONT	01XG	FREMONT PERM IMPS/CALTRANS LOT (I)	718
FREMONT	01XM	FREMONT 1986 PARKG LOT REDESIGN	391
CONCORD	03SD	CONCORD SACTO. NO. RR ROW PKG LOT (I)	444
CONCORD	03SL	CONCORD 1984 RESTRIPING & IMPVTS	204
LAFAYETTE	03JM	LAFAYETTE 1987 PARKG LOT REDESIGN	213
LAFAYETTE	03JE	LAFAYETTE PERM IMPVT/CALTRANS LOT (I)	403
MACARTHUR	07GD	MACARTHUR REDUCE LOT ROW SPACG (III)	105
GLEN PARK	11MB	GLEN PARK MIDDAY/KISSRIDE PKG LOT (I)	58
LAKE MERRITT	01EF	LAKE MERRITT LEASEHOLD IMP. CALTRANS PKG	120
UNION CITY	01VK	UNION CITY 1983 RESTRIPING & IMPVTS	234
NORTH BERKELEY	05GB	NORTH BERKELEY SURFACE LOT EXPANSION	252
EL CERRITO DEL NORTE	05KL	DEL NORTE 1984 RESTRIPING & IMPVTS	514
BAY FAIR	01ML	BAY FAIR 1984 RESTRIPING & IMPVTS	293
SOUTH HAYWARD	01QL	SO. HAYWARD 173-SP PKG EXPAN/PH I (IV)	199
NOT A STATION	04MA	HILLCREST PARK/RIDE LOT - 200 SP	252
SOUTH HAYWARD	01QE	SO. HAYWARD 173-SP PKG EXPAN/PH I (IV)	173
NOT A STATION	04DA	NORTH CONCORD BUS STATN PARKRIDE LOT (XR)	538
NOT A STATION	04GA	BAILEY RD PARK/RIDE LOT - 200 SP	213
ORINDA	03HM	ORINDA 1987 PARKG LOT REDESIGN	232
FRUITVALE	01GM	FRUITVALE 1986 PARKG LOT REDESIGN	238
SAN LEANDRO	01KM	SAN LEANDRO 1986 PARKG LOT REDESIGN	160
VARIOUS		503 NEW SPACES - ELIMINATE RED CURBS	503
		TOTAL SPACES	7,142

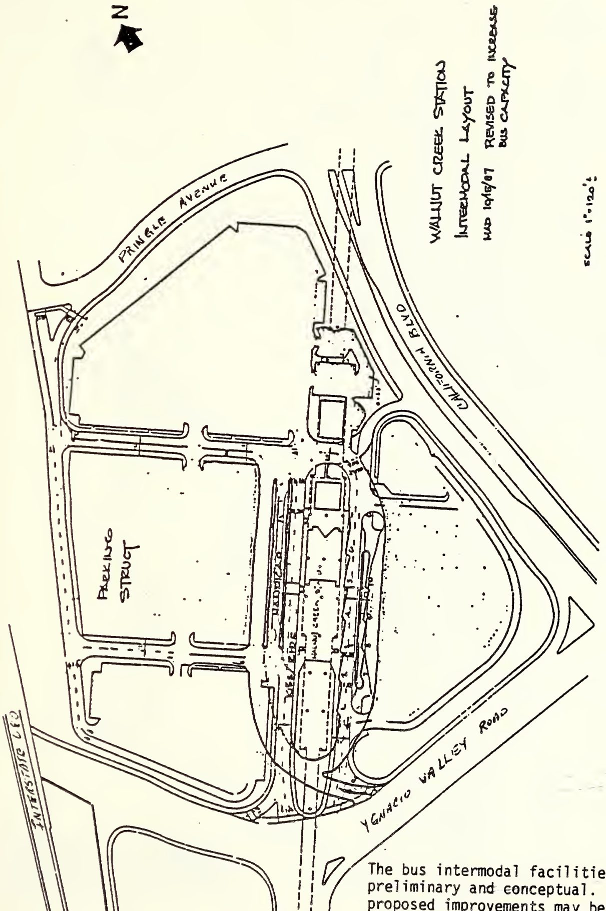


FRUITVALE STATION
INTERMODAL LAYOUT
12/30/86 MAD

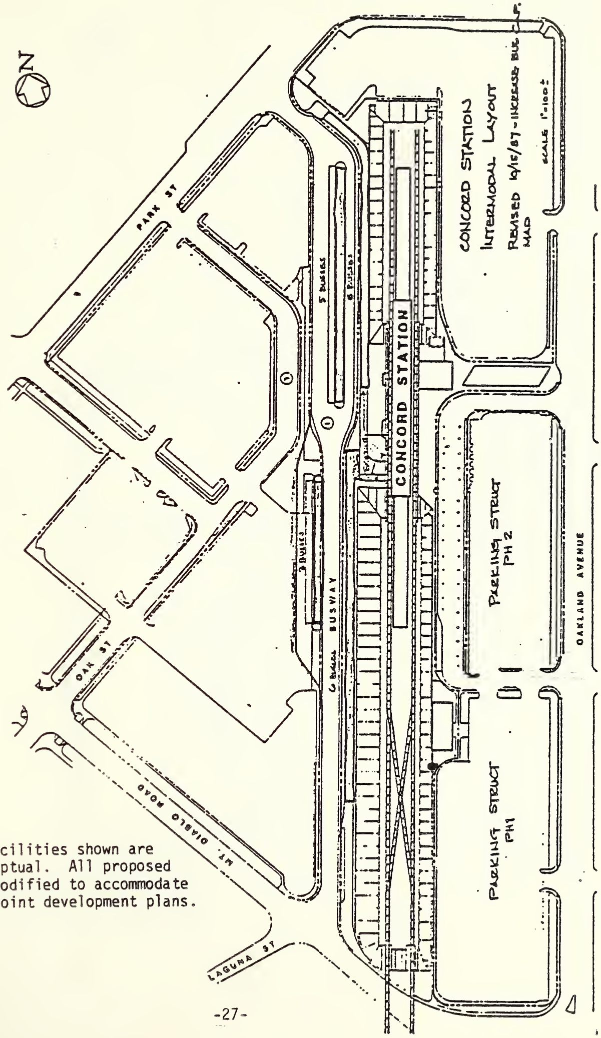
The bus intermodal facilities shown are preliminary and conceptual. All proposec improvements may be modified to accommodate approved and future joint developmer plans.



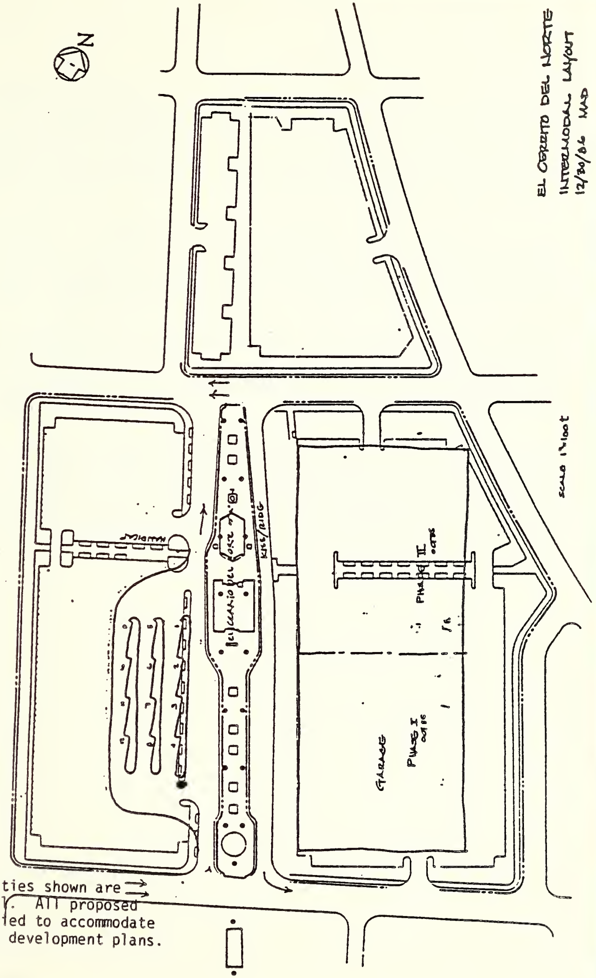
The bus intermodal facilities shown are preliminary and conceptual. All proposed improvements may be modified to accommodate approved and future joint development plans. Note that Kiss Ride location is tentative and may move nearer to station entrance with access from B Street.



The bus intermodal facilities shown ar preliminary and conceptual. All proposed improvements may be modified to accommodate approved and future joint development plans.



The bus intermodal facilities shown are preliminary and conceptual. All proposed improvements may be modified to accommodate approved and future joint development plans.



The bus intermodal facilities shown are preliminary and conceptual. All proposed improvements may be modified to accommodate approved and future joint development plans.

CAPACITY EXPANSION

The Capacity Expansion Program, which has been underway for several years, is 99% funded. The unfunded portion of this program consists of several small projects that enhance the benefits of the program. The purpose of this program is to expand service on the existing BART system. When complete, this program will decrease the intervals between trains, increase the number of trains on the system and increase the number of cars on each train. Train service will increase as specific stages of the program are completed. Each stage of the program is detailed in Figure 10.

The Capacity Expansion Program is composed of twenty projects, two of which have been completed. Figure 11 lists these projects and their funding status. The completed projects are no longer included in the projected five-year financial plan, therefore, they are not included in the total CIP cost. These completed projects are included here because they are an integral part of the major system expansion program.

The two completed projects are: the Fire Hardening project that reinforced the transit vehicle with fire retardant materials in the floors, walls, ceilings and seat cushions; and the KE Track which involved the installation of a third track through downtown Oakland and provided greater operational flexibility at a point in the system where all lines converge as well as provided for additional storage capacity.

There are currently 45 trains that run during the morning and evening commute. The next service expansion to result from this program is scheduled for November 1989 when the total number of trains on-line will be 51. This increment will be possible mainly because of the completion of the Daly City Turnback. Final implementation of the Capacity Expansion Program is scheduled for September 1993. At that time, there will be 58 trains during peak-hour service operating with minimum scheduled headways of two minutes and fifteen seconds.

FIGURE 10

BART CAPACITY EXPANSION PROGRAM
STATUS AS OF MARCH 1989
Target Dates May Be Altered By Changes In Project Completion Schedules

04/12/89

Minimum Headway Capability (Min:Sec)	Projects Required To Achieve or Support This Headway	Anticipated Project Completion Dates	Target Expanded Service Start Dates	Peak Hour Trains Peak Direction Transbay	Peak Period Capacity Trains		On-Line Cars	Spare Cars	Total Cars Required	Available Fleet (Extra)	Fleet Accepted by Engineering	
3:45	Current Service	---	Nov 86	17	45	A C B T	90 8 248 346	14 2 24 40	104 10 272 386	114 (+10) 10 272 396 (+10)	136 48 303 487	A C B T
	47 C-Cars Available for Operations	Jul 89	Aug 89	17	48	A C B T	96 42 243 381	14 2 24 40	110 44 267 421	114 (+4) 44 272 (+5) 431 (+9)	136 83 303 522	A C B T
	Daly City Turnback	Jul 89										
3:10	58 C-Cars Available for Operations	Oct 89	Nov 89	19	51	A C B T	100 52 248 400	14 6 24 44	114 58 272 444	114 58 272 444	136 98 303 537	A C B T
2:30	New On-Board ATC (A-Car Retrofit)	Jul 89	Oct 90	23	52	A C B T	100 91 232 423	14 10 30 54	114 101 262 477	114 101 272 (+10) 487 (+10)	136 150 303 589	A C B T
	Daly City Yard	Sep 89										
	M-87 Interlocking	Nov 89										
	Wayside Train Control/System Performance Mods	Jun 90										
	Electrical Capacity Increase: - Procure/Install Substation	Sep 90										
	101 C-Cars Available for Operations	Sep 90										
2:15	Brake Rate Algorithm Modifications	Mar 91	Apr 91	26	55	A C B T	100 94 239 433	14 10 30 54	114 104 269 487	114 104 272 (+3) 490 (+3)	136 150 303 589	A C B T
	104 C-Cars Available for Operations	Mar 91										
	ICS	May 90	Oct 92	26	58	A C B T	100 110 242 452	14 10 30 54	114 120 272 506	114 120 272 506	136 150 303 589	A C B T
	120 C-Cars Available for Operations	Sep 92										
	128 C-Cars Available for Operations	Jul 93	Sep 93	26	58	A C B T	100 118 242 460	14 10 30 54	114 128 272 514	114 128 272 514	136 150 303 589	A C B T

FIGURE 11

CAPACITY EXPANSION & RELATED PROJECTS
$ 000

FMS #	PROJECTS	FUNDED	UNFUNDED	TOTAL
	CAPACITY EXPANSION PROJECTS			
11—	DALY CITY TURNBACK & YARD	$147,566	$0	$147,566
11TD	DALY CITY SHOP	$7,912	$0	$7,912
15EG	ELECTRICAL CAPACITY IMPROVEMENTS	$7,675	$0	$7,675
20—	WAYSIDE TRAIN CONTROL & SYSTEM PERF. MODS	$14,929	$0	$14,929
41GB	2D GENERATION ATO/138 A-CAR SETS	$15,547	$0	$15,547
42—	150 NEW TRANSIT VEHICLES & ATO	$228,298	$0	$228,298
61—	INTEGRATED CONTROL SYSTEM - ICS	$39,213	$0	$39,213
	SUBTOTAL	$461,140	$0	$461,140
	RELATED PROJECTS			
21BB	HAYWARD YARD IMPROVEMENTS	$0	$400	$400
22BB	CONCORD YARD IMPROVEMENTS	$0	$285	$285
23BB	RICHMOND YARD IMPROVEMENTS	$0	$485	$485
41KD	A-CAR ELECTRONIC TRAIN DESTINATION SIGNS	$570	$0	$570
65DB	CONSIST DATA-MARIS/ICS EXCH.	$124	$0	$124
OXXX	ADDITIONAL TRACK AT OKS	$0	$400	$400
PXXX	CONSTRUCT TRAIN OPERATOR OVERPASSES	$0	$600	$600
QXXX	CASH HANDLING BUILDING EXPANSION	$0	$1,200	$1,200
99*73	C-CAR START-UP	$2,000	$0	$2,000
99*75	SYSTEM PERFORMANCE STUDY JUSTIFIED PROJECTS	$14,000	$0	$14,000
99*81	SYSTEM PERFORMANCE STUDY JUSTIFIED PRJCTS-II	$1,020	$0	$1,020
	SUBTOTAL	$17,714	$3,370	$21,084
	COMPLETED PROJECTS			
07—	KE TRACK	$24,000	$0	$24,000
41E-	VEHICLE FIREHARDENING	$20,800	$0	$20,800
	SUBTOTAL	$44,800	$0	$44,800
	GRAND TOTAL	$523,654	$3,370	$527,024

20-Apr-89

CURRENT DOLLARS

BASIC SYSTEM

The Basic System Program is the backbone of the BART system and is composed of projects that maintain the basic 72-mile infrastructure, satisfy system safety requirements, and enhance system efficiency. This year in evaluating the requirements for the CIP, a comprehensive review was undertaken to identify all projects to be included in the total program. Approximately 65 new projects were identified. This increase in need for capital investment on the Basic System is an outgrowth of the fact that the BART system is nearly 20 years old and is beginning to require rehabilitation. Most of these new projects fell into the Basic System Program.

The single largest project in this program is the procurement of new transit vehicles. This procurement is necessary to support basic operations once Phase I Extensions are brought on line.

The unfunded portion of the Basic System Program is primarily programmed in FY 1993/94 with federal funds. BART anticipates that federal funds will be available in five years to fund a large portion of this unfunded program. The majority of the funded portion of the program is funded with BART reserves and, to a lesser degree, federal and state funds.

Figure 12 is a listing of each project and its funding status.

FIGURE 12

BASIC SYSTEM PROJECTS
$ 000

FMS#	PROJECTS	FUNDED	UNFUNDED	TOTAL
01—	DISTRICT ROOF REPLACEMENT	$364	$1,336	$1,700
(01RM, 03PH & 05NF)	TRAIN OPERATOR BREAK ROOM MODS	$841	$0	$841
01SO	CONSOLIDATE COMPONENT REPAIR SHOP	$254	$0	$254
01SR	WOMEN'S RESTROOM, LOCKERS & SHOWERS-OHY	$88	$0	$88
01VL	UNION CITY INFRASTRUCTURE IMPROVEMENTS	$0	$286	$286
01XL	FREMONT INFRASTRUCTURE IMPROVEMENTS	$0	$137	$137
03CH	34.5KV SUBTRANSMISSION LINE MODS	$98	$0	$98
03FM	WET STANDPIPES-BERKELEY HILLS TUNNEL	$2,245	$0	$2,245
03RB	PATRON EXITING MODIFICATIONS-CONCORD STATION	$136	$55	$191
070B	RENOVATE LOST & FOUND FACILITY	$38	$0	$38
110B	SECOND STAIRWAY-WEST OAKLAND PLATFORM	$729	$0	$729
11FG	2 END STAIRWAYS-PLATE/MEZZ-EMS	$852	$0	$852
11HE	REPLACE LINE SUMP PUMPS	$42	$0	$42
15AZ	WET STANDPIPES & FIRE CONNCECTIONS-21 STATIONS	$3,651	$0	$3,651
15BG	PIGEON CONTROL	$101	$0	$101
15BH	DRY STANDPIPES - SUBWAY	$9,210	$0	$9,210
15CN	RAIL REPLACEMENT	$800	$0	$800
15LC&	ESCALATOR REHABILITATION PROGRAM	$6,082	$0	$6,082
15RB	STATION ENTRANCE CANOPYS	$457	$7,193	$7,650
15SA	UNDERGROUND STORAGE TANK MONITORS	$120	$0	$120
17OC	REPLACE UNDERGROUND FUEL TANKS	$284	$0	$284
20AC	ELIMINATE STATION INTERFACES	$2,400	$0	$2,400
20HB	STATION BACKUP POWER	$2,486	$0	$2,486
21EB&	YARD EFFICIENCY MODIFICATIONS	$319	$0	$319
27OC	RADCOM MODS - CENTRAL CONTROL	$1,750	$0	$1,750
41BU	REINSTALL 6TH CAPACITOR & MOD OVERLOAD RELAY	$163	$0	$163
41EM	COUPLER PINS & SOLENOID VALVES	$145	$0	$145
41JJ	BATTERY OVERTEMPERATURE SENSOR	$181	$0	$181
44—	REGIONAL MULTI-OPERATOR PASS	$5,809	$2,269	$8,078
45AN	MULTI-DENOMINATIONAL BILL VALIDATORS	$197	$0	$197
45BF	IBM TICKET TRANSPORT RETROFIT	$1,675	$0	$1,675
47BA	NINE VENDORS & EIGHT ADDFARES-20 GENERATION	$0	$1,319	$1,319
59CN	STATION TRAIN APPROACH MONITOR	$25	$0	$25
5900	RTA INFORMATION CENTERS	$28	$0	$28
65EO	PLANNING INFORMATION PROCESS NETWORK	$0	$354	$354
65HC	ENGINEERING & CONSTRUCTION MIS	$0	$325	$325
65NB	C & CR AFC RELIABILITY REPORTING	$100	$0	$100
68CO	REPLACE CHILDERS COIN SORTERS	$60	$0	$60
68OE	FOUR (4) TRACTOR/TRAILER ARMORED TRUCKS	$386	$0	$386
79A1	REPLACEMENT MAINT. EQUIP. & SERVICE VEHICLES	$3,821	$955	$4,776
79A2	REPLACE MAINT. EQUIP. & SERVICE VEHICLES	$0	$1,081	$1,081
79B-	REPLACE OVERAGE SEDANS & MAINT. VEHICLES	$290	$0	$290
79KB	TRAIN OPERATOR MEGAPHONES	$43	$0	$43
79MP	RAIL GRINDER	$992	$0	$992
93OP	INVENTORY BUILDUP	$23,407	$0	$23,407
98AA	LEGAL & ADMINISTRATIVE SERVICES-GENERAL	$110	$0	$110
	SUBTOTAL	$70,779	$15,310	$86,089

FIGURE 12 (Cont'd)

BASIC SYSTEM PROJECTS
$ 000

FMS#	PROJECTS	FUNDED	UNFUNDED	TOTAL
AAXX	REPLACE 15 ELECTRIC CARTS IN YARDS	$0	$120	$120
AXXX	REPLACE STATION FIRE ALARMS	$0	$300	$300
BBXX	REPLACE ELECTRIC CART BATTERY CHARGERS	$0	$25	$25
BXXX	ADDITIONAL POLICE RADIO CHANNEL	$0	$500	$500
CCXX	REPLACE REVENUE VEHICLE WHEEL PRESS	$0	$365	$365
CXXX	RAIL REPLACEMENT - 1994	$0	$3,000	$3,000
DDXX	REPLACE LINE PUMPS SYSTEMWIDE	$0	$539	$539
DXXX	REPLACE RAIL LUBRICATORS SYSTEMWIDE	$0	$30	$30
EEXX	REPLACE SEWAGE PUMPS	$0	$270	$270
EXXX	REPLACE INSULATED JOINTS SYSTEMWIDE	$0	$40	$40
FFXX	REPLACE LIGHT FIXTURES-TBT LOWER GALLERY	$0	$150	$150
FXXX	REPLACE DIRECT FIXATION RAIL FASTENERS	$0	$100	$100
GGXX	REPLACE/REFURBISH SHOP ROLL-UP DOORS	$0	$245	$245
GXXX	REPLACE TIMBER AT MAINTENANCE OF WAY	$0	$100	$100
HHXX	REPLACE HVAC LAKE MERRITT ADMINISTRATION •	$0	$2,000	$2,000
HXXX	REPLACE YARD DISCONNECT SWITCH ENCLOSURES	$0	$100	$100
IIXX	REPLACE RADIANT HEATERS IN YARDS & SHOPS	$0	$40	$40
IXXX	PROCURE SWITCH POINT PROTECTORS	$0	$30	$30
JJXX	REPLACE HVAC IN YARDS & SHOPS	$0	$400	$400
JXXX	REPLACE FIR TIES ON CONCORD LINE	$0	$400	$400
KKXX	REPLACE ROOFS ON DISTRICT FACILITIES	$0	$972	$972
KXXX	REPLACE NON SERVICEABLE WHEELS & AXLES	$0	$228	$228
LLXX	REPLACE CARPET LAKE MERRITT & METROCENTER	$0	$250	$250
LXXX	ADDITIONAL REVENUE VEHICLES (145)	$0	$217,500	$217,500
MMXX	REFURBISH LANDSCAPING	$0	$1,175	$1,175
MXXX	REVENUE VEHICLE DOOR REHABILITATION	$0	$3,203	$3,203
NNXX	REPLACE NINE SIDE WINDING STATION GATES	$0	$250	$250
NXXX	COMPUTER END USER NEEDS	$0	$334	$334
OOXX	REPLACE TC2, POLICE, & YARD BASE STATIONS	$0	$150	$150
RXXX	REPLACE AUTOMATIC FILLER MACHINES	$0	$250	$250
SXXX	REPLACE SHREDDING MACHINE	$0	$60	$60
TXXX	REPLACE CASH CARTS	$0	$250	$250
UXXX	REPLACE BILL STACKERS	$0	$225	$225
VXXX	REHABILITATE FARE TICKET TRANSPORTS	$0	$2,576	$2,576
WXXX	REPLACE EMBARCADERO MODULAR ESCALATORS	$0	$500	$500
YXXX	REPLACE HYDRAULIC VALVES IN STATION ELEVATORS	$0	$210	$210
ZXXX	REPLACE MAINT. EQUIP. & SERVICE VEHICLES-1994	$0	$3,500	$3,500
99*15	SYSTEM SAFETY UPGRADE PH. III	$0	$340	$340
99*50	LAND & LAND RIGHTS	$121	$0	$121
99*51	AGENCY AND UTILITY AGREEMENTS	$1,523	$0	$1,523
99*52	OTHER COSTS (INS., BOND AGENTS, ETC.)	$1,870	$0	$1,870
99*54	OUTSTANDING CLAIMS	$3,996	$0	$3,996
99*55	PROJECT DEVELOPMENT	$28,000	$0	$28,000
99*56	PLANNING & STATION AREA DEVELOPMENT	$51,978	$0	$51,978
99*59	STATION AREA DEVELPMNT INFRASTRCTR IMPS.	$5,306	$0	$5,306
99*66	IMPROVEMENT ALLOWANCE ALLOCATION	$15,000	$0	$15,000
	GRAND TOTAL	$178,573	$256,037	$434,610

20-Apr-89

CURRENT DOLLARS

APPENDIX

CAPACITY EXPANSION

DALY CITY TURNBACK, YARD AND SHOP - FUNDED (11--,11TD)

PROJECT DESCRIPTION:

This project is to construct a turnback, yard and shop at Daly City to allow quicker train reversing south of the station and additional train/car storage. Another part of this project involves reconfiguring the M87 interlocking in the vicinity of Daly City.

PROJECT JUSTIFICATION:

Higher density train operations will require a more efficient and less time-consuming train reversing capability at Daly City. An interim measure already completed permits the reduction of the minimum scheduled headway to 3 minutes, 30 seconds through train control modifications in the vicinity of Daly City Station.

A West Bay storage facility will be needed to lay up vehicles not needed for midday operations. Layups at this yard will produce significant savings in power and vehicle maintenance costs. Shop facilities will provide essential support to the new yard and in maintaining lower headways. (The Shop Facilities project is a separate project at a cost of $7.9 million.)

As presently configured, the M-87 interlocking (which provides safe routing of trains in the vicinity of Daly City Station where the tracks cross over each other) creates interference between inbound and outbound trains. Reconfiguring the M-87 interlocking will increase operational flexibility in the vicinity of the Daly City Turnback.

ELECTRICAL CAPACITY INCREASE - FUNDED (15EG)

PROJECT DESCRIPTION:

The purpose of this project is to increase power distribution on the C-line and in all three East Bay yards.

PROJECT JUSTIFICATION:

Operation of additional peak period trains at reduced headways will require additional power distribution facilities on the C-line and in all three East Bay yards. Improvements include the installation of 2 new substations, modification and upgrade of existing yard substations, modification of the third rail and increase of yard feeder cable capacity.

WAYSIDE TRAIN CONTROL/SYSTEM PERFORMANCE MODIFICATIONS - FUNDED (20--)

PROJECT DESCRIPTION:

This project is to implement Wayside Train Control improvements and System Performance Modifications as described below.

PROJECT JUSTIFICATION:

The System Performance Study determined that a number of improvements will be necessary to achieve BART's capacity expansion objectives while maintaining or enhancing service quality. The improvements necessary include the following key tasks:

- Reconfiguration of track circuits by moving and adding blocks to minimize headways and to match Sequential Occupancy Release System (SORS) requirements
- Resignalling of some parts of the system (mostly in San Francisco)
- Improving station approaches
- Modification of SORS software to reduce the time to initialize (reset) the system and to match track modifications
- Optimization of speed codes systemwide
- Development and implementation of a delay reduction program
- Development of the simulator to include the delay model .
- Modification of the Brake Rate Algorithm

YARD IMPROVEMENTS - UNFUNDED (21BB,22BB,23BB)

PROJECT DESCRIPTION:

This project is to install wiring, circuits and equipment (including car detection) to support yard control improvements at Concord, Richmond and Hayward train yards.

PROJECT JUSTIFICATION:

Some storage tracks at Concord and Hayward yards do not have operational train control capability. Installation of appropriate train control components will improve overall operational efficiency in both yards.

Modifications at the Richmond yard are required in order to optimize the operational benefits of the new C-cars.

NEW ON-BOARD ATC - FUNDED (41GB)

PROJECT DESCRIPTION:

This project will replace existing Automatic Train Control (ATC) units on all A-cars with the new units that have recently been designed for the C-cars.

PROJECT JUSTIFICATION:

The existing ATC units on A-cars represent the largest single cause of vehicle service disrupting failures on the system. The New On-Board ATC will substantially reduce ATC hardware failures and, through the use of redundancy, will reduce ATC-caused service disrupting failures by a factor of 25 to 1. These units are being installed in all new C-cars and are being retrofitted into existing A-cars.

A-CAR ELECTRONIC TRAIN DESTINATION SIGNS - FUNDED (41KD)

PROJECT DESCRIPTION:

This project is to install electronic train destination signs in all A-car cabs similar to those installed in the new C-cars.

PROJECT JUSTIFICATION:

These signs will offer general improvement over the plastic destination signs that are currently being displayed in the A-cars and will also enhance the ability to provide special information when needed. Visibility will be greater and aesthetics will also be greatly improved.

C-CARS - FUNDED (42--)

PROJECT DESCRIPTION:

The purpose of this project is to procure 150 additional revenue transit vehicles that are designed to operate in any position on a train. These new cars are designated as C-cars.

PROJECT JUSTIFICATION:

One hundred fifty new revenue vehicles are needed to service anticipated patronage growth. The new C-cars will permit expansion of existing trains to the maximum length of 10 cars long, addition of new trains on the system (after headways are reduced), and efficient on-line sizing of trains. These cars can be placed at the head of a train (like an A-car) or in the middle of a train (like a B-car).

INTEGRATED CONTROL SYSTEM - FUNDED (61--)

PROJECT DESCRIPTION:

The Integrated Control System (ICS) project will implement a new central train computer, in conjunction with various supporting wayside equipment, to provide capability of operating above the current 55 train limit.

PROJECT JUSTIFICATION:

The central train computer, in conjunction with various supporting wayside equipment, provides systemwide train supervision and control. The existing central computer is capable of monitoring and controlling the movement of up to 55 trains at any one time. Expansion of the central control capabilities is needed to allow for on-line train operations exceeding the current 55 train limit, and have the capability to incorporate extensions into the BART system. ICS will allow BART to operate 75 on-line trains initially, with the capability of expanding the control system for operating 115 trains.

CONSIST DATA-MARIS/ICS EXCHANGE - FUNDED (65DB)

PROJECT DESCRIPTION:

This software development project will allow the Management Information System (MIS) computer to exchange data with the Integrated Control System (ICS) computer.

PROJECT JUSTIFICATION:

The purpose of this project is to provide:

- the Integrated Control System (ICS) with corrected consist data so that train operations controllers can make mainline consist size changes.
- more timely, accurate, complete and consistent consist data for train operations users.
- continuing support for the COMSPEC and Train Delay Monitor application systems on the Management Information System computer complex.
- the Maintenance and Reliability Information System (MARIS) with consist data, and facilitate the return of consist data corrections to ICS.
- for keeping required efforts within reasonable bounds for affected personnel.

ADDITIONAL TRACK INSTALLATION - UNFUNDED (OXXX)

PROJECT DESCRIPTION:

Purchase of land for and installation of additional track at Oakland Shop.

PROJECT JUSTIFICATION:

Additional track is required to store high-rail maintenance vehicles at Oakland Shops. Project requires land acquisition from Union Pacific.

CONSTRUCT OVERPASSES - UNFUNDED (PXXX)

PROJECT DESCRIPTION:

Design and Construct Train Operator Overpasses.

PROJECT JUSTIFICATION:

Once end-of-line makes and breaks become operational, yard stops on tracks one and two on the C and A Lines will be necessary to move T/O's between the yards and end-of-line.

CASH BUILDING EXPANSION - UNFUNDED (QXXX)

PROJECT DESCRIPTION:

Construct expansion of the Cash Building to provide for projected cash handling increase and employee facilities.

PROJECT JUSTIFICATION:

Expansion is required to provide more operating room, expanded restroom facilities (25 women share 2 stalls) and expanded locker rooms.

C-CAR START-UP - FUNDED (99*73)

PROJECT DESCRIPTION:

This project includes training and other miscellaneous costs associated with placing the new C-cars in service.

PROJECT JUSTIFICATION:

A number of activities of an administrative and training nature are anticipated to be required prior to placing all C-cars in service. This project covers all or part of those costs.

SYSTEM PERFORMANCE STUDY JUSTIFIED PROJECTS - FUNDED (99*75)

PROJECT DESCRIPTION:

This project covers miscellaneous modifications to the train control system to bring the system up to the full potential identified as possibly achievable in the System Performance Study.

PROJECT JUSTIFICATION:

When BART was seeking funding of the System Performance Study modifications (Wayside Train Control SPS Justified Mods), UMTA expressed reluctance to fund a part of the work called "Delay Reduction". BART subsequently agreed with the TOCC to fund these tasks from BART sources. This project covers these costs.

SYSTEM PERFORMANCE STUDY JUSTIFIED PROJECTS - PH II - FUNDED (99*81)

PROJECT DESCRIPTION:

This project is the final stage of miscellaneous modifications to the new train control system.

PROJECT JUSTIFICATION:

Minor refinements to support operational requirements will be required once the new train control system is implemented.

BASIC SYSTEM

DISTRICT ROOF REPLACEMENT - PARTIALLY FUNDED (01--)

PROJECT DESCRIPTION:

The purpose of this project is to replace roofing on various facilities throughout the District.

PROJECT JUSTIFICATION:

Approximately fifty percent of District facilities have leaking roofs due to age. This project prioritizes and phases the work over a five-year period based on the severity of the leakage.

TRAIN OPERATOR BREAK ROOM MODIFICATIONS - FUNDED (01RM,03PH,05NF)

PROJECT DESCRIPTION:

This project will provide additional locker, restroom, and break room facilities at three East Bay Yards.

PROJECT JUSTIFICATION:

All three BART train yards have a transportation building for train operators, transportation supervisors and clerical support staff. This facility provides a combination kitchen/lunchroom with space for vending machines, and table and chairs, separate restrooms and locker rooms for male and female train operators, and office space for administrative personnel. These transportation buildings provide a place for train operators to prepare for shift check in and out, where lunches and breaks are taken and where a variety of administrative matters are handled.

When the BART system was built, there was an estimate made of required capacity for break rooms. It was based on train run times and the expected number of operators required to operate trains. The original estimate has proven wrong due to several factors. For example, the travel time (from one end of a line to another) has increased since the original design. Work rules require a break between runs which was not originally envisioned. Another example is that the number of train operators required for yard operations is more than originally planned.

Consequently, it takes more train operators to run current service than was originally planned. Thus, the train operator break rooms are marginally sufficient for even current operations and need to be expanded for planned service increases.

There are approximately 258 train operators at BART. When peak revenue service expands, approximately 30 additional train operators will be required. The transportation facilities are overcrowded with some lockers housed in restrooms. With the addition of 30 train operators, the situation will worsen. Additionally, separate restroom facilities for men and women are required.

This project rehabilitates and expands current transportation buildings for maintaining existing levels of service by providing for adequate restroom and locker capacity for train operators who operate the trains.

CONSOLIDATE COMPONENT REPAIR SHOP - FUNDED (01SO)

PROJECT DESCRIPTION:

With the completion of the new storeroom at Hayward Shop, the old storeroom area has become available. This area is adjacent to the major component repair activities at the Hayward Shop and provides a means to consolidate all remote component repair activities and accommodate the additional work space required to support the new equipment on the C-car.

PROJECT JUSTIFICATION:

Consolidation will improve efficiency and support C-car activities and provide the necessary space to incorporate repair facilities for new equipment such as inverters, air conditioning units, etc.

WOMEN'S RESTROOM/LOCKERS & SHOWER - OHY - FUNDED (01SR)

PROJECT DESCRIPTION:

An existing men's restroom will be expanded and converted into a women's restroom with adequate shower facilities and locker space.

PROJECT JUSTIFICATION:

This project is required to accommodate the increased number of females working on the Hayward Shop floor. In the last eight years, the number of females employed in the shop has gone from five (5) to fourteen (14). There is only one women's restroom in the shop area, as compared to three men's restrooms and locker and shower facilities.

REBUILD PAVEMENT AT FREMONT & UNION CITY - UNFUNDED (01VL, 01XL)

PROJECT DESCRIPTION:

The Fremont and Union City pavement overlays will be redesigned and reconstructed to significantly improve their strength in order to handle heavier loads.

PROJECT JUSTIFICATION:

Bus and heavy traffic loads have caused the existing pavement to break up. Delays in repairing the pavement will result in further deterioration of the sub-base and increased cost to rebuild the composites. There is a potential for liability claims resulting from the deteriorated pavement.

34.5KV SUBTRANSMISSION LINE MODS-CLN - FUNDED (03CH)

PROJECT DESCRIPTION:

Modifications to the 34.5KV sub-transmission traction power line between Orinda and Concord include (1) Insulating the PILC cable potheads, (2) Installing surge supressors for the cables, (3) Removing plants that interfere with underground cables, (4) Providing new supports for cable splices in aerial boxes, and (5) Removing aerial conduit slip joints and resupporting the cable.

PROJECT JUSTIFICATION:

There have been numerous 34.5KV PILC cable failures which have required about 50 repair splices. These recent failures constitute an excessive failure rate, with such failures possibly impacting revenue service. The modifications described above will improve the failure rate, making the cables more reliable and maintainable.

WET STANDPIPE SYSTEM/SOUTH BORE-BHT - FUNDED (03FM)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install a Wet Standpipe system in the Berkeley Hills Tunnel (BHT) with outlets every 300 feet.

PROJECT JUSTIFICATION:

Fire services have no facilities available in the south bore of the BHT. This project is recommended by staff as an alternate to Gage Babcock Associates's recommendation (#18) of installing a second main in the south bore of the BHT and has been concurred with by the CPUC and it's consultants.

PATRON EXITING MODIFICATIONS - CONCORD STATION - PARTIALLY FUNDED (03RB)

PROJECT DESCRIPTION:

This project is to add an additional stairway at Concord Station to accommodate increases in patronage.

PROJECT JUSTIFICATION:

This project is to add one platform stairway at Concord Station in order to improve station platform access and egress. Two factors contribute to this access deficiency. First, BART will implement closer headways on all lines resulting from the Capacity Expansion program which means that passengers will offboard in stations at more frequent intervals. Thus, the project continues system improvements to provide increased capacity. Second, business development in the Concord Station area is creating a reverse commute which will require improved station access for the reverse flow of patrons.

It is therefore in the best interest of the patron that an additional stairway be constructed. During peak periods, the additional stairway will better accommodate the reverse passenger flow and minimize disruption of normal patron exiting.

RENOVATE LOST & FOUND FACILITY - FUNDED (07DB)

PROJECT DESCRIPTION:

This project will create an enclosed room (which can be accessed from the paid and free areas) at Twelfth Street Station for processing lost and found items.

PROJECT JUSTIFICATION:

This project will bring the current makeshift lost and found facility up to current county safety code standards.

2 STAIRWAYS-PLATFORM/CONCOURSE-WOS - FUNDED (11DB)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install two additional stairways, one for each of two platforms, from the platform level to the concourse level at West Oakland station.

PROJECT JUSTIFICATION:

The emergency exiting time from the West Oakland platforms is currently 7.65 minutes, which exceeds the 6.0 minute limit agreed to by BART, the CPUC and the Fire Liaison Committee (FLC). Adding the additional stairways will bring the platform exiting times within the agreed upon time limits.

2 END STAIRWAYS-PLATFORM/CONCOURSE-EMS - FUNDED (11FG)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install two additional stairways, one at each end of the station, from the station platform to the concourse at Embarcadero Station.

PROJECT JUSTIFICATION:

The emergency exiting time from the platform exceeds the 6.0 minute limit agreed to by BART, the CPUC and the FLC. Adding the additional stairways will bring the platform exiting times within the agreed upon time limits.

RPLACE LINE-SECTION SUMP PUMPS-PPS - FUNDED (11HE)

PROJECT DESCRIPTION:

The two pumps at the Powell Street pumping station will be replaced. These pumps are mounted in a 16 ft. deep sump and are difficult to access for maintenance. The pumps will also be redesigned for easier access.

PROJECT JUSTIFICATION:

One of the two pumps at the Powell Street pumping station has failed and is beyond repair. The second pump is noisy and is expected to fail in the near future. Since these pumps have no direct replacement, it is necessary to re-specify the pumps, which will allow for easy access as maintenance is required.

The pumps handle the inflow of ground water. If the pumps fail the tunnels could become flooded, thereby impacting revenue service.

WET STANDPIPES-STATIONS & SUBWAYS - FUNDED (15AZ)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to provide eleven (11) at grade stations with fire department connections and extend the station wet standpipe systems in twenty (20) above grade stations. Below grade, eight (8) failed dry standpipes will be replaced with new wet standpipes spaced 300 to 370 feet apart. Additionally, 60 cabinets will be installed in the stations for storage of fire hose at the connection points of the undercar sprinkler system.

PROJECT JUSTIFICATION:

The project will implement Gage Babcock Associates' recommendations Nos. 10 and 11 at stations that are not below grade. In subways, the failed dry standpipes must be replaced. Replacement with wet standpipes will satisfy part of Gage Babcock Associates' recommendation No. 13, at least for the 8 subway locations in question. The hose cabinets are an alternative to Gage Babcock Associates' recommendation of directly connecting the undercar sprinklers, and has been concurred with by the CPUC and their consultant.

PIGEON CONTROL - FUNDED (15BG)

PROJECT DESCRIPTION:

This project provides for installation of pigeon netting and fencing at eight stations to eliminate pigeon roosting.

PROJECT JUSTIFICATION:

Installation of pigeon netting and fencing will help protect passengers from pigeon droppings and keep stations clean.

DRY STANDPIPES(56) - SUBWAYS - FUNDED (15BH)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and will replace the remaining 56 dry standpipes in the underground. These standpipes will have outlets every 300 feet and water flow of 500 GPM at 100 PSIG. This project is in addition to the wet standpipes being replaced under project 15AZ.

PROJECT JUSTIFICATION:

The project will complete the implementation Gage Babcock Associates' recommendation No. 13 ("Provide all underground line sections with wet standpipe systems...") which has been vigorously supported by the fire departments and has the endorsement of the CPUC, their consultant, and BART.

RAIL REPLACEMENT - FUNDED (15CN)

PROJECT DESCRIPTION:

This project is part of an ongoing program to replace rail as it reaches the end of its life expectancy.

PROJECT JUSTIFICATION:

Due to BART trains traveling up to speeds of 80 mph, with an acceleration rate of 4.4 feet per second squared operating under a fully automated train control system, it is most important that the track structure be maintained at a level that meets Federal Railway Administration and other transit systems safety standards.

ESCALATOR REHABILITATION PROGRAM - FUNDED (15LC&)

PROJECT DESCRIPTION:

This project will provide for the rehabilitation of station escalators throughout the system.

PROJECT JUSTIFICATION:

District escalators have been operating approximately 20 hours per day for the last 10 to 12 years. Based on the increased shutdown for repairs, it is believed that District escalators are reaching their optimum life expectancy and require this major rehabilitation.

STATION ENTRANCE CANOPYS - PARTIALLY FUNDED (15RB)

PROJECT DESCRIPTION:

The purpose of this project is to cover all exposed escalator and stairway entrances to subway stations.

PROJECT JUSTIFICATION:

BART presently has 43 escalators exposed to the elements. These units are located at 36 entrances of eight stations in Oakland and San Francisco. These units have significantly higher failure rates, take longer to repair and have a shorter life span than protected units. In addition, because they are exposed, they are more hazardous to patrons during inclement weather. Installation of covers over these exposed units would increase the reliability of these units and extend their useful life. There are 14 subway entrances, with stairs only, at downtown Berkeley, Oakland and San Francisco that are open to the weather. Enclosure of these entrances would improve station cleanliness and appearance and enhance security for patrons and employees.

UNDERGROUND STORAGE TANK MONITORS - FUNDED (15SA)

PROJECT DESCRIPTION:

This project is necessary to bring the District into compliance with California State Law revisions which require tanks containing hazardous materials to be monitored for leaks.

PROJECT JUSTIFICATION:

The District owns 22 underground tanks, 13 of which have been exempted from the new regulations. Of the nine remaining tanks, one waste oil tank at Richmond Yard will be removed completely. Three tanks, one each at Richmond, Concord and Hayward yards, will be replaced with double-walled tanks with monitoring systems. In addition, a monitoring system will be installed for an existing diesel tank at the MetroCenter. The four remaining tanks are handled in a separate project discussed below.

REPLACE UNDERGROUND FUEL TANKS - FUNDED (17DC)

PROJECT DESCRIPTION:

This project is to replace four underground fuel storage tanks located at Oakland Shops.

PROJECT JUSTIFICATION:

This project will bring fuel tank storage operations up to California State Administrative code requirements. Four tanks will be replaced with new double-walled tanks and tank monitoring devices.

ELIMINATE STATION INTERFACES - FUNDED (20AC)

PROJECT DESCRIPTION:

This project will provide the necessary interstation cables and complete the other required modifications to the train control equipment to eliminate the headway constraints at 11 locations.

PROJECT JUSTIFICATION:

This modification will allow continuous "following move speed profiles" across the interface, thus reducing the minimum headways between trains at critical locations. The present train control system does not have sufficient numbers of vital interstation cables necessary to pass the individual track circuit occupancies.

STATION BACKUP POWER - FUNDED (20HB)

PROJECT DESCRIPTION:

This project is intended to purchase and install equipment and batteries to upgrade the essential power systems in train control rooms.

PROJECT JUSTIFICATION:

Certain BART train control and communications equipment is supplied by essential power systems. These systems provide uninterruptible power during station power outages and isolate the supplied equipment from utility power system transient disturbances. Currently, uninterruptible power systems (UPS) furnish this essential power.

The original installations are now loaded to a point that certain critical equipment is not supplied by uninterruptible power systems. Some functions which are presently supplied by essential power will be replaced by new projects, but total demand will continue to be greater than the existing essential power capacity. Providing additional essential power would improve availability of voice and data communications between central control and field locations during periods of loss of power from the local utility.

The scope of this project is to provide for design, furnishing, and installation of equipment and batteries to upgrade the essential power systems in the train control rooms of 31 stations (three stations have been handled by earlier contracts), three yards, three ventilation structures and one portal structure for new and existing systems.

Upon completion of this project, existing essential power supply equipment would be replaced at all 38 locations with new static-type uninterruptible power supply equipment similar to the existing equipment, but of a larger capacity. Existing battery capacities at all locations would be sized to one and one-half hour capacity.

YARD EFFICIENCY MODIFICATIONS - FUNDED (21EB&)

PROJECT DESCRIPTION:

This project will complete installation of Automatic Car Identification (ACI) system in the Concord, Richmond, and Hayward yards.

PROJECT JUSTIFICATION:

The ACI scanning systems and associated hardware/software at BART identify and automatically record the location of individual BART cars throughout the BART system. This project pertains to the incomplete yard portions of the scanning systems.

Subsequent to the installation of the original ACI systems, BART extended some storage tracks and added others in the three storage yards. Cars entering or stored in these added areas are "lost" to the scanning system and consequently not automatically recorded. The current procedure requires otherwise busy personnel to manually track and record the location of cars on the added or extended tracks. This project will permit the installation of additional ACI systems in the yard areas where needed.

Manual input of car locations can lead to errors during busy times such as morning and evening layups; afternoon buildups; replacement of bad order trains; and repaired cars that are moved from the revenue vehicle shop area to storage tracks. Such manual procedures can interfere with mainline operations by distracting tower operators. Errors have allowed bad-order cars to be dispatched. Then the train must be removed causing a missed dispatch and sometimes an off-load.

RADCOM MODIFICATIONS - CENTRAL CONTROL - FUNDED (270C)

PROJECT DESCRIPTION:

The purpose of this project is to install upgraded electronic equipment in Central Control.

PROJECT JUSTIFICATION:

This project provides for the replacement of obsolete electronic equipment in Central Control such as computer consoles; and also includes replacement of the flooring. Installation of upgraded equipment will enhance the ability of Central operations and maintenance personnel to perform their duties.

INSTALL SIXTH CAPACITOR & MODIFY OLR - FUNDED (41BU)

PROJECT DESCRIPTION:

This project adds a sixth capacitor to the propulsion system and changes the response time of the traction motor overload relay (OLR) in order to reduce the number of traction motor overloads.

PROJECT JUSTIFICATION:

The transit vehicle propulsion system continues to have a high number of overload failures which result in flashed traction motors, failed T-1 thyristors, blown main fuses and blown shoe fuses (with resultant motor alternator failures). These failures can disrupt mainline operation when smoke is generated from the overload, impact the shop work load and stress other propulsion system equipment.

COUPLER PINS & SOLENOID VALVES - FUNDED (41EM)

PROJECT DESCRIPTION:

This project will replace the couple yoke pin and the uncoupling solenoid valve on all A and B cars.

PROJECT JUSTIFICATION:

This modification will prevent unanticipated car uncouplings which have occurred in the past.

BATTERY OVER-TEMPERATURE SENSOR - FUNDED (41JJ)

PROJECT DESCRIPTION:

There are 350 revenue vehicles which require the installation of a battery overtemperature circuit. The circuit includes a temperature sensor in the battery compartment and circuitry which automatically shuts down the battery charger when an overtemperature condition occurs.

PROJECT JUSTIFICATION:

In the last several years there have been four cars which have had battery fires. The repair cost is approximately $50,000 per car per occurrence. The Battery Overtemperature Sensor installation will pay for itself by preventing future battery fires.

To date this has not been considered a safety problem because it only occurs on cars stored in the yard with auxiliaries running. However, it could become a problem if cars are stored in tunnels with auxiliaries operating. Tunnel storage may be required in order to satisfy future operating requirements.

REGIONAL MULTI-OPERATOR PASS - PARTIALLY FUNDED (44--)

PROJECT DESCRIPTION:

The purpose of this project is to develop on-board validator hardware and software for installation on Central Contra Costa Transit Authority (CCCTA) and BART Express buses. In addition, credit/debit machines will be installed at stations serving CCCTA and BART Express buses.

PROJECT JUSTIFICATION:

This demonstration project will develop the hardware and software required to provide total, regional multi-modal transfers with just one ticket. The initial phase encompasses development and installation of on-board validators on one hundred eleven Central Contra Costa Transit Authority (CCCTA) buses, which serve five BART stations and on BART Express bus routes which serve five stations. The stored value equipment will provide for transfers among operators, with the capability to provide for operator discounts at multiple levels. The on-board equipment will act like a BART gate, subtracting fare from a stored value ticket, with the amount depending on whether a connecting BART trip is being made. As more operators are added (Phases II and III), the equipment will keep track where tickets are used to facilitate revenue sharing among operators. In addition, debit/credit machines will be installed, as well as modifications made to the existing BART faregates in order to accommodate this new equipment.

MULTI-DENOMINATIONAL BILL VALIDATORS - FUNDED (45AN)

PROJECT DESCRIPTION:

The "Multi-Denomination Bill Validators" project is intended to replace the $1 and $5 validators presently installed in IBM ticket vendors with units that will accept $1, $5, $10 and $20 denominations.

PROJECT JUSTIFICATION:

Reduction in bill handling will reduce maintenance and operating costs. Patron complaints of not being able to use higher denomination bills will be eliminated.

IBM TICKET TRANSPORT RETROFIT - FUNDED (45BF)

PROJECT DESCRIPTION:

This project is to retrofit ticket vending machines, addfare machines and fare gates with updated components.

PROJECT JUSTIFICATION:

IBM fare machines in some locations have been operating continually for over 15 years. Examination of the ticket handling mechanism (THM) of two fare gates and one ticket vendor reveals that 60-90% of the moving components are sufficiently defective to require replacement with updated components.

9 VENDORS AND 8 ADDFARES - UNFUNDED (47BA)

PROJECT DESCRIPTION:

The purpose of this project is to procure nine (9) ticket vendors and eight (8) addfare machines to be installed at various BART stations.

PROJECT JUSTIFICATION:

Based on a comparison of a simulation model and systemwide performance criteria, AFC deficiencies were identified. Primarily, these deficiencies are unacceptable levels of patron queuing at exit faregates, ticket vendors and addfares. To overcome these deficiencies, it was determined that seven vendors and seven addfares would have to be procured. In addition, faregates now in storage would be modified to current baseline configuration and installed.

The benefit of this project is improved convenience to passengers during the peak period. This project is required to maximize the benefits of BART's Capacity Expansion program. The Capacity Expansion program is nearly funded and represents a major commitment of federal, state, local and BART funds. Without smaller projects such as this one, BART is put in the position of providing greater capacity for service in a manner that is inefficient and inconvenient for passengers.

This project includes the installation of 2 vendors and one addfare at Daly City Station to support the Daly City Intermodal project.

STATION TRAIN APPROACH MONITORS - FUNDED (59CN)

PROJECT DESCRIPTION:

This is a demonstration project to determine if a graphic display of train movement is obtainable from the train control computers and if such information is useful to patrons. The eventual goal is to have train display monitors in the paid areas and free areas to provide patrons with exact train location information.

PROJECT JUSTIFICATION:

The demonstration project is designed to provide passengers and employees (Station Agents) with current information relative to exact train locations. The intent is to improve communications so that patrons know when to be at the platform and when there is a system delay. A/C Transit Supervisors will be able to determine how long buses should be held at a station to wait for an approaching train.

PB&R INFO PROCESS NETWORK-EUC - UNFUNDED (65ED)

PROJECT DESCRIPTION:

This project will provide for additional computers in the Planning, Budget and Research (PB&R) department which will be linked together over a network for information sharing purposes.

PROJECT JUSTIFICATION:

The additional computers and computer network will enable the PB&R department to support BART's extension projects without major staff increases. This additional support is gained through increased productivity.

E&C PROJ MGT NETWORK SYST-PH.2 - UNFUNDED (65HC)

PROJECT DESCRIPTION:

The project provides for a tailored PC-based cost/schedule control system that is linked to the District's mainframe-based Financial Management System. The project will provide an integrated scheduling and cost control system at the project management level. This part of the project is Phase II of a four phase project which is described below.

PROJECT JUSTIFICATION:

The project consists of four phases:

- Phase I, which is essentially complete, provides for the initial data base design and link to BART's mainframe system

- Phase II, which is this project, prototypes the network design, then implements the network with five departments participating.
- Phase III provides for PC/networking implementation for the Extensions Department Facility and direct networking to E&C for shared use of the Project Management/Tracking Program data base.

- Phase IV has been identified as total PC networking for Maintenance and Engineering departments.

The project is required to provide electronic integrated scheduling, cost control, reporting and project management system tools, at the project management level. Completion of this project meets UMTA requirements for Project Control, electronic Critical Path Management (CPM) scheduling, and reporting of Federally funded projects. Capital Programs will use the Project Management data as input to UMTA's Grant Management Information System (GMIS) network.

COMMUNICATIONS & COMPONENT REPAIR AFC RELIABILITY REPORTING - FUNDED (65NB)

PROJECT DESCRIPTION:

This project involves installing input terminals in station agent booths to transmit automatic fare collection (AFC) failure incidents and repairs to a mini computer located at the Lake Merritt reporting location. The project includes project development, testing and implementation.

PROJECT JUSTIFICATION:

The problems in AFC incident reporting arise from the failure of the current telephone taping system to provide an accurate and timely on-line status report. These problems include technical problems with the tape recorders and telephone lines between Hayward Shop and the stations; unreported incidents and repairs; and incorrect or unclear information on the tapes.

REPLACE CHILDERS COIN SORTERS - FUNDED (68CD)

PROJECT DESCRIPTION:

The purpose of this project is to replace two coin sorter machines with new equipment.

PROJECT JUSTIFICATION:

The performance of the machines over the last four years has continued to degrade, and maintenance has become increasingly difficult due to lack of spare parts. Spare parts must be custom made since these are not production machines. Replacement of parts is costly and contributes to extended down time. In recent months, down time has increased and several problems have arisen which affect fare collection maintenance and cash counting operations. This equipment purchase will reduce machine down time, and reduce costs through reduced maintenance and cost of parts.

FOUR TRACTOR/TRAILER ARMORED TRUCKS - FUNDED (68DE)

PROJECT DESCRIPTION:

The purpose of this project is to replace four armored trucks with armored tractor-trailer trucks.

PROJECT JUSTIFICATION:

Four armored vehicles are currently used for handling and transporting cash. The current fleet of trucks is overage and overdue for retirement. In addition, the present fleet will be unable to handle the increased demands for handling and transporting cash as a result of the Capacity Expansion Program.

REPLACE MAINTENANCE/SERVICE VEHICLES & EQUIPMENT-PARTIALLY FUNDED (79A1 & 79A2)

PROJECT DESCRIPTION:

This project is to procure replacement maintenance/service vehicles and equipment.

PROJECT JUSTIFICATION:

Properly operating maintenance/service vehicles and equipment assist BART in providing safe, comfortable, reliable and efficient service.

BART's maintenance equipment gradually becomes worn from age and usage. Eventually it becomes more economical to replace the old equipment rather than repair it. The ongoing equipment replacement program assures that old, wornout equipment is replaced in a timely manner to minimize overall costs and ensure personnel safety. If this equipment is not replaced, overall costs will increase and maintenance crews will be disrupted by failed equipment.

This maintenance equipment includes such items as electric and pneumatic grinders and hand tools, portable light and power generator sets, light towers, air compressors, electric carts for transporting personnel and material, commercial lawnmowers, ground maintenance equipment, vacuums, floor scrubbers, polishers and various floor maintenance equipment; shop equipment such as jacks, jack stands, saws, drills, engine test equipment, electric and electronic meters, gauges, test instruments and equipment.

BART has a fleet of light-duty highway vehicles to transport personnel and necessary equipment to work sites in the District. In addition, BART police and District personnel use sedans for regular duties. These vehicles are selected for replacement according to a consistent procedure developed by BART staff. Generally, the policy requires that sedans and pickups must be replaced after 70,000 miles and vans and police cars after 90,000 miles. At current usage rates, an average of 40 light-duty vehicles must be replaced each year. On the average, this is equivalent to replacing each vehicle every five years.

However, heavily used vehicles are replaced more often while lightly used vehicles are replaced less often.

Heavy-duty maintenance vehicles also need periodic replacement. Maintenance personnel use these vehicles, which include diesel trucks, tractors, and track-maintenance vehicles, to repair and maintain BART's physical plant and to respond to emergencies. These vehicles' costs and useful lives vary widely.

Annual replacement needs and costs vary accordingly. The ongoing vehicle replacement program assures that all support vehicles are replaced in a cost-effective manner. Without this program, continued use of overage vehicles would increase maintenance and other costs, as well as safety-hazards to personnel.

REPLACE HIGHWAY VEHICLES - FUNDED (79B-)

PROJECT DESCRIPTION:

The purpose of this project is to procure various maintenance vehicles, administrative sedans and police vehicles.

PROJECT JUSTIFICATION:

Due to limited funding for replacement vehicles, BART currently has over twenty vehicles that exceed the District criteria for replacement. To continue operating these vehicles will result in increased maintenance due to major repairs that are required.

MEGAPHONES FOR T/O'S - FUNDED (79KB)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is for the purchase of megaphones for use by Train Operators.

PROJECT JUSTIFICATION:

The project will satisfy a Gage Babcock Associates' recommendation that is supported by the fire departments and the CPUC. Megaphones are believed to enhance the communication ability of the Train Operators during emergency evacuations.

RAIL GRINDER - FUNDED (79MP)

PROJECT DESCRIPTION:

This project provides for the acquisition of one rail grinder.

PROJECT JUSTIFICATION:

The replacement rail grinder will retire the present, nearly worn out vehicle and also provide added rail grinding capability to support train service expansion. Rail grinding is a very important facet of the maintenance program as it ensures lessening wheel impact on the revenue car due to rail corrugation as well as providing patrons with a smooth, quiet ride.

INVENTORY BUILDUP - FUNDED (93DP)

PROJECT DESCRIPTION:

This project is to purchase inventory which is needed to sustain revenue service.

PROJECT JUSTIFICATION:

This work is necessary for continued adequate on-hand inventory.

LEGAL & ADMINISTRATIVE SERVICES - GENERAL - FUNDED (98AA)

PROJECT DESCRIPTION:

This project provides funding for a contract employee to coordinate the Universal Ticket Program.

PROJECT JUSTIFICATION:

The Universal Ticket Project will require close coordination and resolution of several critical issues including revenue sharing and distribution, selection of a service bureau, and establishment of inter-operator transfer policies. Because these services cannot be satisfactorily performed by existing BART staff, a consultant will be hired to perform the work.

REPLACE ELECTRIC CARTS - UNFUNDED (AAXX)

PROJECT DESCRIPTION:

This project replaces 15 electric carts in yards.

PROJECT JUSTIFICATION:

These carts are 10 years old and are failing. These carts are used to transport operations and maintenance personnel around the yards and shop areas.

STATION FIRE ALARM SYSTEMS - UNFUNDED (AXXX)

PROJECT DESCRIPTION:

This project is a safety-related project which includes replacement of station fire alarms.

PROJECT JUSTIFICATION:

Existing alarms at 32 stations are obsolete, parts are no longer manufactured and the alarms have a high failure rate.

REPLACE ELECTRIC CART BATTERY CHARGERS - UNFUNDED (BBXX)

PROJECT DESCRIPTION:

This project is to replace cart battery chargers in yards.

PROJECT JUSTIFICATION:

Battery chargers are used to charge electric cart batteries and are needed in concurrence with the electric cart replacement project.

ADDITIONAL POLICE RADIO CHANNEL - UNFUNDED (BXXX)

PROJECT DESCRIPTION:

This project is to add an additional police radio channel to supplement the existing channel.

PROJECT JUSTIFICATION:

BART Police Services requires a second police radio channel to relieve the primary channel of radio traffic in the event of an emergency.

REPLACE REVENUE VEHICLE WHEEL PRESS - UNFUNDED (CCXX)

PROJECT DESCRIPTION:

This project is to replace the revenue vehicle wheel press.

PROJECT JUSTIFICATION:

The existing wheel press was purchased 15 years ago (used) and is now 40-50 years old. Parts are hard to find because the press is obsolete. It is frequently down for repairs.

RAIL REPLACEMENT - 1994 - UNFUNDED (CXXX)

PROJECT DESCRIPTION:

The replacement of worn rail throughout the system is an ongoing project.

PROJECT JUSTIFICATION:

Replacement of rail is required every 5-7 years.

REPLACE LINE PUMPS - UNFUNDED (DDXX)

PROJECT DESCRIPTION:

This project replaces/refurbishes line pumps systemwide.

PROJECT JUSTIFICATION:

The existing pumps are 20 years old and ready for replacement. These pumps are required to pump out water from underground trackways to prevent flooding.

REPLACE RAIL LUBRICATORS - UNFUNDED (DXXX)

PROJECT DESCRIPTION:

This project is to replace the rail lubricators systemwide.

PROJECT JUSTIFICATION:

These components are nearly 20 years old, have never been replaced, and are failing with increased frequency. A failure increases friction between the rails and the wheels.

REPLACE SEWAGE PUMPS - UNFUNDED (EEXX)

PROJECT DESCRIPTION:

This project is to replace/refurbish sewage pumps.

PROJECT JUSTIFICATION:

The existing pumps are 20 years old and ready for replacement. These pumps are required to pump out sewage from underground stations to prevent sewage backing up into the station platform areas.

REPLACE INSULATED JOINTS - UNFUNDED (EXXX)

PROJECT DESCRIPTION:

This project provides for the replacement of trackway insulated joints systemwide.

PROJECT JUSTIFICATION:

These components are nearly 20 years old, have never been replaced, and are failing with increased frequency. A failure causes a false occupancy.

REPLACE LIGHTING FIXTURES-TRANSBAY TUBE - UNFUNDED (FFXX)

PROJECT DESCRIPTION:

This project replaces lighting fixtures in the Transbay Tube lower gallery.

PROJECT JUSTIFICATION:

Replacement of the existing fixtures is required because there are no longer replacement lenses for the fixtures currently installed. The old lenses would be salvaged for use in other subways.

REPLACE DIRECT FIXATION RAIL FASTENERS - UNFUNDED (FXXX)

PROJECT DESCRIPTION:

This project provides for the replacement of existing Direct fixation rail fasteners at curves in the rail structure.

PROJECT JUSTIFICATION:

These components are nearly 20 years old, have never been replaced, and are failing with increased frequency. These fasteners are used in places where the rail curves.

REPLACE SHOP ROLL-UP DOORS - UNFUNDED (GGXX)

PROJECT DESCRIPTION:

This project replaces/refurbishes the shop roll-up doors.

PROJECT JUSTIFICATION:

The doors require replacement at all three yards because the doors are obsolete and parts are no longer available. The doors malfunction frequently and must be removed for repair.

REPLACE TIMBER AT MAINTENANCE OF WAY ACCESS POINTS - UNFUNDED (GXXX)

PROJECT DESCRIPTION:

This project replaces old timber in maintenance of way access points.

PROJECT JUSTIFICATION:

The trackbeds at maintenance of way access points are made of wood and have deteriorated due to continuous exposure to the elements over the past 20 years. Replacement insures continuing maintenance of the system infrastructure.

REPLACE HVAC AT LAKE MERRITT - UNFUNDED (HHXX)

PROJECT DESCRIPTION:

This project replaces heating, ventilation and air conditioning (HVAC) system at Lake Merritt Station Administration Building.

PROJECT JUSTIFICATION:

The existing LMA HVAC system is ineffective and highly energy inefficient and requires manual manipulation. The new system would be automatic and would save BART $125K/year in energy costs.

YARD DISCONNECT SWITCH ENCLOSURES - UNFUNDED (HXXX)

PROJECT DESCRIPTION:

This project provides for the replacement of all yard disconnect switch enclosures throughout the system.

PROJECT JUSTIFICATION:

These components are nearly 20 years old, have never been replaced, and are failing with increased frequency. These switches isolate storage tracks and spur tracks.

REPLACE HEATERS IN YARDS AND SHOPS - UNFUNDED (IIXX)

PROJECT DESCRIPTION:

This project replaces radiant heaters in yards and shops.

PROJECT JUSTIFICATION:

The radiant heaters in the shops are old and replacement parts are no longer available.

PROCURE SWITCH POINT PROTECTORS - UNFUNDED (IXXX)

PROJECT DESCRIPTION:

This project provides for the procurement and installation of switch point protectors.

PROJECT JUSTIFICATION:

This initial installment of this component is an enhancement designed to protect the switches in the yards from getting hit and being damaged by the wheels of revenue vehicles.

REPLACE HVAC-YARDS AND SHOPS - UNFUNDED (JJXX)

PROJECT DESCRIPTION:

This project replaces heating, ventilation and air conditioning (HVAC) in Yards and Shops.

PROJECT JUSTIFICATION:

The current systems are not energy efficient and are extremely expensive to maintain and operate. A new automatic system would pay for itself in efficient energy usage within a short period.

REPLACE FIR TIES ON CONCORD LINE - UNFUNDED (JXXX)

PROJECT DESCRIPTION:

This project replaces wooden fir ties with concrete ties on the C-Line.

PROJECT JUSTIFICATION:

This project is to hire a contractor to replace wooden ties with concrete ties on the C-Line. The concrete ties have already been procured.

DISTRICT ROOF REPLACEMENT - UNFUNDED (KKXX)

PROJECT DESCRIPTION:

This project replaces roofs on District Facilities.

PROJECT JUSTIFICATION:

Part of this project has been previously approved by PRB and is funded with BART reserves. This phase of the project would cover the remaining 12 leaking roofs in the District.

REPLACE NON-SERVICEABLE WHEELS & AXLES - UNFUNDED (KXXX)

PROJECT DESCRIPTION:

This project is to replace non-serviceable wheel assemblies & axles on the transit vehicles.

PROJECT JUSTIFICATION:

Approximately 125 wheel assemblies, 35 axles and 250 tires/rims per year require replacement due to wear and damage during revenue operation. These components are replaced during normal maintenance.

REPLACE CARPET - UNFUNDED (LLXX)

PROJECT DESCRIPTION:

This project replaces carpet in the Lake Merritt & MetroCenter Administration buildings.

PROJECT JUSTIFICATION:

The carpeting in the Lake Merritt Administration building is badly worn and frayed at the seams causing a safety hazard for employees. The carpet on the 2nd floor of the Metro building is also badly in need of replacement.

ADDITIONAL REVENUE VEHICLES (145) - UNFUNDED (LXXX)

PROJECT DESCRIPTION:

This project is to purchase 145 Revenue Vehicles for capacity expansion and extensions.

PROJECT JUSTIFICATION:

Additional rolling stock is required to support basic system operations once Phase I Extensions are brought on line.

REFURBISH LANDSCAPING - UNFUNDED (MMXX)

PROJECT DESCRIPTION:

This project is to refurbish landscaping and install new sprinkler systems throughout the system where needed.

PROJECT JUSTIFICATION:

In some areas the District landscaping is in need of replacement. This project focuses on the installation of automatic sprinklers at 10 stations and planting drought-resistant plants on the C-Line.

REVENUE VEHICLE DOOR REHABILITATION - UNFUNDED (MXXX)

PROJECT DESCRIPTION:

This project will replace the side doors on the current fleet of revenue vehicles.

PROJECT JUSTIFICATION:

The present polyurethane filled side doors have absorbed moisture over the years and have swelled. This causes problems in operations when doors hang up in door pockets and will not properly open and close. In addition to swelling, moisture absorption causes the doors to lose their contour and require reworking. Vehicle Engineering has designed a new honeycomb sandwich door which will not be subject to moisture absorption. The new door would have a positive operational impact on the system as one of the most frequent failures on the transit vehicle is door-related.

REPLACE SIDE WINDING GATES - UNFUNDED (NNXX)

PROJECT DESCRIPTION:

This project replaces nine (9) side winding gates at applicable stations with motorized gates.

PROJECT JUSTIFICATION:

Debris causes the gates to jam open or closed. Replacement with motorized gates will reduce maintenance requirements to repair jammed gates and provide better security for the stations involved.

COMPUTER END USER NEEDS - UNFUNDED (NXXX)

PROJECT DESCRIPTION:

The purpose of this project is to purchase micro-computers and accessories throughout the District.

PROJECT JUSTIFICATION:

Over the past several years, the District has undertaken a study of the micro processing needs to provide compatibility and maximization of use. This project provides network capability that has been detailed in the District end-user survey, as well as yearly end-user needs.

REPLACE VARIOUS RADIO BASE STATIONS - UNFUNDED (OOXX)

PROJECT DESCRIPTION:

This project will replace Train Control Channel 2 (TC2), Police, & Yard Base Stations.

PROJECT JUSTIFICATION:

These base stations require replacement because they have reached the end of their useful life. TC2 is 20 years old, and the others are 14 years old.

AUTOMATIC FILLER MACHINES - UNFUNDED (RXXX)

PROJECT DESCRIPTION:

This project will replace automatic filler machines in the Cash Handling building.

PROJECT JUSTIFICATION:

BART currently has two homemade filler machines. These two homemade filler machines are unique. When parts require replacement, engineering is required to do the design as there are no drawings available. Both machines are old and unreliable.

SHREDDING MACHINE - UNFUNDED (SXXX)

PROJECT DESCRIPTION:

This project will purchase a new shredding machine to replace the current shredding machine.

PROJECT JUSTIFICATION:

This machine is 15 years old and parts are no longer available for it. This machine is used to shred tickets to avoid ticket fraud. BART Police also use it when they require shredding.

CASH CARTS - UNFUNDED (TXXX)

PROJECT DESCRIPTION:

This project replaces old cash carts at the Cash Handling Building.

PROJECT JUSTIFICATION:

The existing carts are 17 years old and require a complete overhaul of various components. Due to the age of the carts, it is more cost effective to replace them.

BILL STACKERS - UNFUNDED (UXXX)

PROJECT DESCRIPTION:

This project replaces old bill stackers at the Cash Handling Building.

PROJECT JUSTIFICATION:

These stackers have a useful life of 5 years and are nearing the end of their useful life. There is no benefit in repairing them once they are worn. Stackers provide secure transport of bills from CHB to the vendors.

REHABILITATE FARE TICKET TRANSPORTS - UNFUNDED (VXXX)

PROJECT DESCRIPTION:

This project provides for rehabilitation of fare ticket transports systemwide.

PROJECT JUSTIFICATION:

The ticket transports of all IBM and Cubic gates, vendors and addfares require refurbishing every five years. The overhaul includes replacement of bearings, rollers, belts, heads and printers.

EMBARCADERO MODULAR ESCALATORS - UNFUNDED (WXXX)

PROJECT DESCRIPTION:

This project provides for the rehabilitation and replacement of the Embarcadero Modular Escalators.

PROJECT JUSTIFICATION:

These escalators are nearly 20 years old and are of a different type than other station escalators and are not as reliable. Maintenance costs are currently $10,000/month.

REPLACE HYDRAULIC VALVES IN STATION ELEVATORS - UNFUNDED (YXXX)

PROJECT DESCRIPTION:

This project replaces Hydraulic Valve on station elevators.

PROJECT JUSTIFICATION:

These valves have never been replaced since initial operations, are leaking hydraulic fluid, and are experiencing increased failures.

REPLACEMENT NON-REVENUE VEHICLES & EQUIPMENT - 1994 - UNFUNDED (ZXXX)

PROJECT DESCRIPTION:

This project will replace Maintenance Equipment and Vehicles.

PROJECT JUSTIFICATION:

This project is to replace various sedans, vans, maintenance trucks, heavy maintenance vehicles and maintenance equipment due to normal wear.

SYSTEM SAFETY UPGRADE PH III - UNFUNDED (99*15)

PROJECT DESCRIPTION:

The purpose of this project is to provide miscellaneous support for the System Safety Upgrade project.

PROJECT JUSTIFICATION:

In 1979, BART experienced a fire in the Transbay Tube. The District subsequently hired the consultant firm of Gage-Babcock and Associates to perform a study of the system to determine whether or not there were safety deficiencies. The recommended modifications and improvements have been completed which have improved fire safety including transit vehicle fire hardening, improved fire hydrant connections in the Berkeley Hills Tunnel and improved communications capability. This project supports the final phase of the project.

LAND AND LAND RIGHTS - FUNDED (99*50)

PROJECT DESCRIPTION:

This project allows completion of basic system real estate transactions.

PROJECT JUSTIFICATION:

There are continuing miscellaneous costs associated with purchases of the original right-of-way.

AGENCY AND UTILITY AGREEMENTS - FUNDED (99*51)

PROJECT DESCRIPTION:

This activity represents payments due, when billed, for completion of basic system utility relocations, street closures, street restorations, drainage, etc., accomplished by various governmental agencies and utilities.

PROJECT JUSTIFICATION:

During initial system construction a number of utilities, streets, etc., needed to be relocated. In most cases BART paid governments and utilities to accomplish the work. Some of the work has not been billed to date.

OTHER COSTS (INSURANCE, BOND AGENTS, ETC.) - FUNDED (99*52)

PROJECT DESCRIPTION:

This activity covers costs associated with completion of the basic system including insurance, bond agent costs associated with the initial bond issue, contracts administration, etc.

PROJECT JUSTIFICATION:

Work is needed to continue meeting obligations made during initial system construction.

OUTSTANDING CLAIMS - FUNDED (99*54)

PROJECT DESCRIPTION:

This item represents a reserve against outstanding and potential claims arising out of the basic system construction.

PROJECT JUSTIFICATION:

This reserve is needed to meet potential obligations.

PROJECT DEVELOPMENT - FUNDED (99*55)

PROJECT DESCRIPTION:

This project covers costs associated with preliminary engineering and design which are necessary to bring projects to a stage of readiness where a grant application can be submitted. It also covers preliminary work on some BART funded projects.

PROJECT JUSTIFICATION:

For a project to be fully considered by UMTA or MTC for funding it must be "well defined". These costs cover work necessary to meet that requirement.

PLANNING & STATION AREA DEVELOPMENT - FUNDED (99*56)

PROJECT DESCRIPTION:

This is ongoing planning work associated with extensions, access, and joint development efforts.

PROJECT JUSTIFICATION:

Planning is needed to meet future capacity/operational requirements needs as well as to capture potential income associated with BART property around stations.

STATION AREA DEVELOPMENT INFRASTRUCTURE IMPROVEMENTS - FUNDED (99*59)

PROJECT DESCRIPTION:

These are costs associated with street, utilities, and other improvements needed to support joint development projects.

PROJECT JUSTIFICATION:

In order to achieve the greatest return on BART joint development projects, it is necessary to provide improvements to local facilities around BART stations.

IMPROVEMENT ALLOWANCE - FUNDED (99*66)

PROJECT DESCRIPTION:

This project represents miscellaneous work including capitalized maintenance projects, minor modifications to facilities, and urgent capital projects that are required sooner than can be accomplished by the five year lead on MTC programming.

PROJECT JUSTIFICATION:

These projects are necessary for maintaining the integrity of the basic operation.

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BART

BAY AREA RAPID TRANSIT DISTRICT

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1989 BART CAPITAL IMPROVEMENT PROGRAM

SEPTEMBER 1989

BART FACTS
FISCAL YEAR 1988/1989 DATA
(JULY 1988 - JUNE 1989)

FIXED FACILITIES

Mainline Track: Revenue service is provided over 71.5 miles of double mainline 66 inch guage track, of which approximately 20 miles are in subway, 24 elevated, and 27 at grade.

Stations: There are 34 stations including 14 in subway, 13 elevated, and 7 at grade. Average station spacing is between 1/2 to 1 mile within and adjacent to San Francisco, Oakland, and Berkeley downtown areas, and 2 to 4 miles apart in suburban areas. Automatic fare collection equipment is located in each station to vend and process patron tickets. As of June 1989, BART provides 26,592 free paved parking spaces at 23 stations and 200 paved spaces at one additional station at a daily charge of 25¢ per space.

Maintenance Facilities: Equipment maintenance is performed at three Eastbay yards located in Hayward, Concord, and Richmond. A special track geometric vehicle is used to analyze the running rails and electrical third rail. Maintenance of right-of-way is routinely performed during off-revenue hours.

Administrative/Central Control Center: Trains are automatically controlled by wayside equipment and supervised by the central computer at BART headquarters located above the Lake Merritt Station in Oakland. Operators on board the leading car of each train have full voice communication with central control personnel and passengers on board, and can override automatic controls should the need arise.

ROLLING STOCK

Fleet Inventory: BART owns three types of revenue vehicles. Control equipped A-cars contain 72 seats, are 75 feet long by 10.5 feet wide, and can only be used as a lead or trail vehicle on each train. Non-control equipped B-cars also contain 72 seats, are 70 feet by 10.5 feet, and can only be used as a mid-train vehicle. Control equipped C-cars contain 64 seats, are 70 feet by 10.5 feet, and can be used as a lead, mid-train, or trail vehicle. As of June 1989, BART owns 137 A-cars, 303 B-cars, and 90 C-cars. All of these vehicles are in the operating fleet except for two A-cars and two B-cars. One A-car is retained as an engineering test vehicle, one A-car and one B-car were removed due to accident damage, and one B-car is in long-term storage.

Trains: Train lengths range from 3 to 10 cars. Corresponding seating capacity is between 192 and 720 passengers. Scheduled top speed is 70 mph with a systemwide average of 33 mph, including station stops. Trains stop at each station along a designated route.

SERVICE HOURS

Rail: Rail service is provided between the hours of 5 am and 1:30 am Monday through Friday, 6 am to 1:30 am on Saturdays, and 9 am to 1:30 am on Sundays and major holidays. Closings for individual stations are timed with the schedule for the last train beginning at approximately midnight. Service frequencies (in minutes) for individual routes and line segments are as follows:

	TRANSBAY ROUTES			EASTBAY	CBD LINE SEGMENT	
	Concord-Daly City	Fremont-Daly City	Richmond-Daly City	Richmond-Fremont	San Francisco	Downtown Oakland
WEEKDAY						
Peak Hour	7.5	11	15	15	3.8**	3.8
Midday	15	15	15	15	5	5
Night	20	*	*	20	20	10
SATURDAY						
Daytime	20	20	20	20	6.7	6.7
Night	20	*	*	20	20	10
SUNDAY/HOLIDAY						
All Day	20	*	*	20	20	10

*Requires transfer between Concord/Daly City and Richmond/Fremont routes.
**3.0 minute headway service is operated during peak 15 minutes.

Express Bus: The District also provides express bus service within major travel corridors not served by rail in both Alameda and Contra Costa counties in the Eastbay. Bus service frequencies (in minutes) are as follows:

	Eastern Contra Costa	Western Contra Costa	Central Contra Costa-Alameda	Eastern Alameda
WEEKDAY				
Peak Hour	15	30	30	30
Midday	30	30	30	30
Night	60	40	60	60
SATURDAY				
Daytime	60	40	45	30
Night	60	40	60	60
SUNDAY/HOLIDAY				
All day	60	*	60	60

*No service during this time period.

(Continued on inside back cover)

SF S16 #63 1989

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

BART 1989

CAPITAL IMPROVEMENT PROGRAM

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, as amended, as passed through the Metropolitan Transportation Commission.

The contents of this report reflect the views of BART, which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the original views or policy of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

All projects discussed are subject to state and federal environmental review as required by law. Specific projects and project funding are subject to approval by the District's Board of Directors and the availability of funding from BART and outside funding sources. Projects that do not yet satisfy these requirements are considered to be proposed projects.

September 1989

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

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INTRODUCTION

TODAY....LOOKING TO THE FUTURE

After operating rail service for 16 years, BART is on the brink of a major service expansion. What passengers have seen already are new transit vehicles and a third track that runs through downtown Oakland. What passengers will be seeing over the next couple of years are more new transit vehicles, more trains operating at shorter intervals and more parking at BART stations. Other improvements that will benefit passengers but will be "invisible" to the public include implementation of the new train control system, enhanced traction power capability and additional facilities for storage and repair of transit vehicles. The most dramatic change will occur within the next one to two years when construction is scheduled to begin on the first of four proposed rail extensions. In total, BART proposes to add over 32 miles of extensions to the existing 72-mile system.

The 1989 Five-Year Capital Improvement Program (CIP) is BART's blueprint for expanding service within the existing system and a preview of proposed future rail extensions. The document that follows describes the financial plan for the overall capital improvement program and provides a description of each component in the program.

CAPITAL PLANNING PROCESS

The preparation of the Five-Year Capital Plan is the final development stage of the BART capital program. The initial stages involve an ongoing internal review of new capital projects. The Project Review Board (PRB) meets on a monthly basis to review new capital projects. Part of the project review process includes identifying potential fund sources for the project. Approved projects are either funded from BART reserves or require grant applications for funding from outside sources. Once a year, PRB prepares an unfunded capital project list which serves as the basis for BART's submission to the Metropolitan Transportation Commission (MTC) capital priorities process. After the PRB approves this list, it is presented to the BART Board of Directors for approval before its submission to MTC. The regional Transportation Improvement Plan (TIP) is derived from all regional operators' submissions to the MTC capital priorities process. The BART Five-Year Capital Plan incorporates all BART projects that are in the regional TIP as well as projects funded from BART sources that do not appear in the TIP.

PROGRAM OVERVIEW

The CIP is made up of two chapters. Chapter One is the Financial Plan which discusses the strategy for funding the capital program and describes the proposed funding sources. The Extensions Program remains the focus of the capital program because it represents the greater funding challenge, requires the most legislative support and accounts for approximately 61% of the total program. The Extensions Program is included as part of the total capital program and is also broken out as a separate program area showing greater detail because of its size and complexity. Chapter One also presents the status of BART reserves.

Chapter Two is the Program Description. This chapter breaks out each of the four program areas and briefly describes them. In addition, this chapter lists all of the projects that comprise each program area and shows the funding status of each project. A description of each project in the Capacity Expansion Program and Basic System Program is contained in the Appendix.

CHALLENGES....THE AUTOMOBILE AND FUNDING

For the sixth straight year, the annual Bay Area Council Poll shows that the number one concern for the majority of Bay Area residents is transportation. With freeways exceeding capacity and the reluctance of cities to support freeway widening projects, one obvious alternative is expanded public transportation capability. The glut of cars on Bay Area freeways is caused by many factors including growth and the declining price of gasoline. In developing a capital improvement program, BART is ever mindful of the need to provide service that is more attractive than driving an automobile.

Consistent with the concern expressed in the Bay Area Council Poll, the regional and local electorate have passed measures to increase the sales tax by one half cent in three counties and to increase tolls on Bay Area bridges to fund various transportation and highway projects. Continued support from federal and state funding agencies and the electorate is vital for the successful implementation of the BART capital program. The challenge is to continue to expand this support to the point where financing for the total Capital Improvement Program is in place.

CHAPTER I

FINANCIAL PLAN

CAPITAL PROGRAM SUMMARY

BART's current $2.9 billion Capital Improvement Program has experienced considerable growth in the past year. Of the four capital program areas, Extensions, Access, Capacity Expansion and Basic System, most of the growth results from a number of new projects that support the Basic System and the addition of the proposed Colma and San Francisco Airport Extensions. Unlike older systems on the East Coast which have experienced major system rehabilitation, BART is faced with the first major overhaul of many components that support the Basic System. The new Basic System projects are largely unfunded and represent a new funding challenge.

The Extensions Program is made up of those projects that expand the basic rail system beyond the existing 72-mile system. The Access Program is composed of projects designed to improve patron traffic to and from the station areas as well as within the stations. The Capacity Expansion Program is designed to increase and enhance train capacity of the current system. The Basic System Program consists of replacement projects that support the basic infrastructure and other wayside components.

Projects that are programmed with BART reserves are considered **funded** projects because the funds are available. In the case of some reserves, specific Board approval is required before expenditures can be made. Projects that are **programmed** with funds from outside sources are considered **unfunded** projects until such time as there has been a grant award by the appropriate funding agency. **Earmarked** funds indicate a **commitment** by an outside funding source to support a portion of the Extensions Program.

FINANCING THE CAPITAL PROGRAM

The cost for the total CIP is $2.9 billion. Extensions costs are in 1987 dollars, all other costs are in current dollars. Individual costs for each program within the CIP are shown in Figure 1. Figure 2 shows the overall funding status of the CIP. BART contributions to the CIP total $517 million. The Capacity Expansion Program is the only program area that is almost 100% funded while the Extensions and Basic System Programs make up the majority of the unfunded CIP. Most of the unfunded portion of the Basic System Program consists of the new transit vehicle acquisition to support basic operations once Phase I Extensions have been brought on-line.

The Extensions program is approximately 61% of the total CIP. Figure 3 shows the break out of costs by extension and Figure 4 shows the funding mix for the total Extensions Program. The costs shown are based on Phase I Extensions and Phase II planning and right-of-way acquisition. Phase I Extensions include two-station additions from Fremont, Concord and Bay Fair Stations; and a rail extension from Daly City Station to the San Francisco Airport which includes the one-station Colma Extension.

The primary funding source for the funded portion of the Access Program is the BART 1985 Revenue Vehicle Bond Issue. Approximately $76 million of the unfunded portion of the Access Program is programmed with UMTA funds. The Capacity Expansion Program was funded from a combination of federal, state, local and BART funds. Approximately 55% of the funding came from federal sources. BART reserves account for 26% of the funding for the program. The funded portion of the Basic System Program comes from BART sources and UMTA funds. The new revenue vehicle acquisition, at an approximate cost of $218 million, represents the largest segment of the unfunded portion of the Basic System Program. This acquisition of 145 new revenue vehicles beginning in the mid 1990's is a critical component of service delivery as Phase I Extensions are brought on-line.

EXTENSIONS FINANCING....INNOVATIONS

The most complex financing scheme involves the Extensions Program. Phase I Extensions are to be funded from a combination of BART, regional, UMTA and State sources including the proceeds of half-cent sales tax measures passed by the voters in three counties. In the past two years, half-cent sales tax measures have passed in Alameda (1986), San Mateo (1988) and Contra Costa (1988) Counties in support of transportation projects. In all three instances, the BART Extensions Program has benefitted from the passage of these measures. Although the San Mateo County measure was specifically in support of Caltrain projects, passage of this measure gave the County the added flexibility to provide support for a BART rail extension in San Mateo County. In Alameda County, $148 million is presently programmed for the Dublin-Pleasanton and the Irvington-Warm Springs Extensions. In Contra Costa County, the proceeds of the half-cent sales tax measure will fund $178 million of the Pittsburg-Antioch Extension. These amounts are assumed to escalate.

In addition to these county measures, voters passed a regional measure in 1988 to increase the tolls on Bay Area bridges to fund a variety of bridge improvements and public transit projects. Approximately seven million dollars per year of this toll increase will go toward BART Phase I East Bay Extensions.

The foundation for the current Phase I Extensions Program financial plan is the agreement that was adopted by both the BART Board of Directors and the San Mateo County Transit District (SamTrans) in June 1988. This agreement defined the terms under which BART would provide rail service to Colma and the San Francisco Airport in San Mateo County. San Mateo County is currently outside the existing three-county BART District. The Principles of Agreement specify that the cost of the San Francisco Airport Extension be 75% financed with federal funds with 25% matching funds from SamTrans. In addition, Samtrans agreed to a $200 million payment to BART which will be available for Phase I East Bay Extensions projects. This $200 million contribution from SamTrans was the catalyst for development of the financing plan for Phase I East Bay extensions.

BART RESERVES PROJECTIONS

Figure 5 is a summary of BART reserves. This table illustrates the five-year cash draw-down against the current cash balances of all BART reserves. The total available funding, which includes accumulated interest over the five-year period, is approximately $356 million. Approximately $293 million in programmed expenditures leaves a balance of nearly $63 million. This balance is considered a necessary capital contingency in support of the total capital program, and in support of expected inflation of the Extensions Program.

TODAY....LOOKING TO THE FUTURE

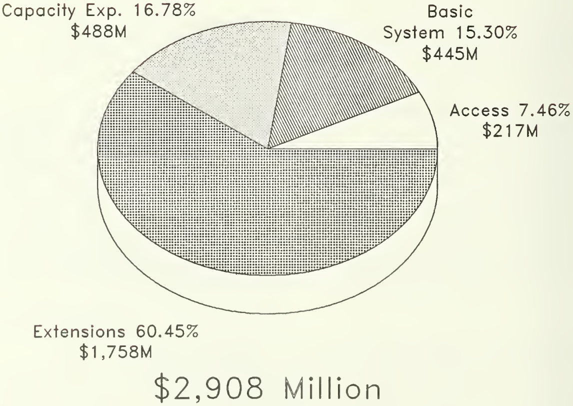
While the Extensions Program is the object of considerable capital investment, the needs of the Basic System are becoming significant. The primary identifiable funding source for the Basic System Program is UMTA funds. However, this need to fund the rehabilitation of existing system components comes at a time when federal funds continue to decrease substantially each year.

Bay Area residents recognize the benefits of expanding the rapid transit system and at the same time expect reliable and efficient service today. The challenge for the next five years and beyond is to insure that BART is able to expand into a system that will provide greater capacity for more passengers throughout the Bay Area.

The greater challenge will be to insure that adequate funding is available to support BART's capital program. In the past year, BART has successfully negotiated an agreement with SamTrans that has taken Phase I Extensions beyond the planning stage and a step closer to realization. Working with MTC and other transit operators in the region, BART has helped formulate a regional new starts financial plan.

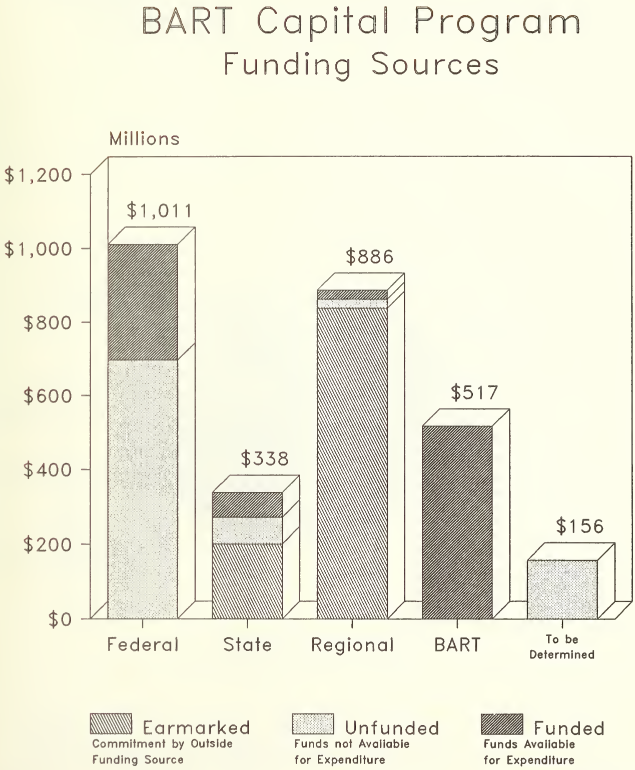
FIGURE 1

BART Capital Program
Proposed Funding Uses



Extensions costs are in 1987 dollars, all other costs are in current dollars.

FIGURE 2

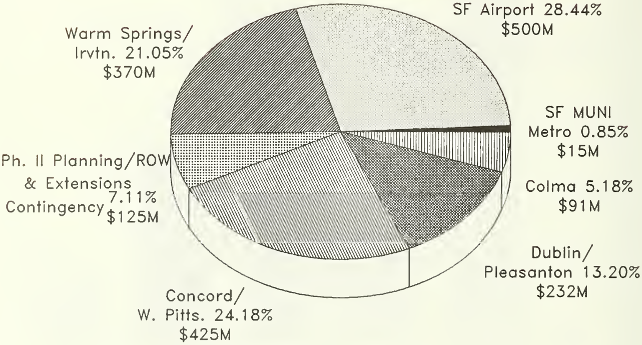


Extensions costs are in 1987 dollars, all other costs are in current dollars.

FIGURE 3

BART Extensions Program

Proposed Funding Uses

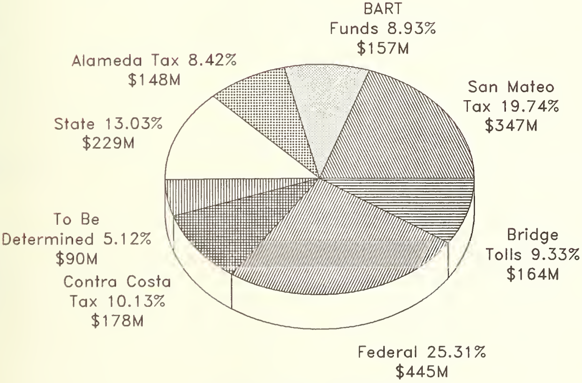


$1,758 Million

Extensions costs are in 1987 dollars, all other costs are in current dollars.

FIGURE 4

BART Extensions Program
Funding Sources



$1,758 Million

- Extensions costs are in 1987 dollars, all other costs are in current dollars.
- This figure includes funded, unfunded and earmarked sources. See Figure 2 for definitions

SUMMARY OF BART RESERVE CASH BALANCES

(Estimate in $000's for 1994)

	Line Item	Cumulative Total
Cash Balances (Projected to June 30, 1989)		
- General Construction (Fund 01)*	18,519	231,717
- Basic System Completion (Fund 01)*	9,500	
- System Improvement Reserve	2,200	
- Revenue Bond Construction Fund	186,567	
- Interest Transfer Fund	5,661	
- DC Reserve/Full Funding Agmt.	140	
- Multi-Year Capital Allocations	2,499	
- Extensions Right-of-Way Reserve	666	
- Improvement Allowance	5,965	
Capital Allocations from Operating Budget		65,541
C-Car Safe Harbor Leasing		19,205
Interest		39,494
Total Available Funding		355,957
Less Programmed Expenditures		
BART Obligations, Local Shares, and Costs Unavailable from Grant Sources		(292,839)
Contingency Funds (Balance)		
- DC Full Funding Grant Agreement		(140)
- Project Contingency		(17,978)
- Extensions Inflation Contingency		(45,000)
Total Programmed Expenditures		(355,957)

* Interest accrues to the GO Bond Fund and is available in the five year period; however, reserve balances do not change from year to year to reflect this since the interest does not actually accrue to the specific reserve.

CHAPTER II

PROGRAM DESCRIPTION

EXTENSIONS.....WHERE THE MONEY COMES FROM, WHERE IT GOES

Funding

From a funding standpoint, the Extensions Program is the most complicated and the greatest challenge. Figure 6 identifies the funding sources and the status of the program. As this figures shows, each extension is programmed with its own particular mix of funding. To date, BART has expended and BART funds to acquire rights-of-way, conduct environmental studies and, in some instances, initiate preliminary engineering and design.

A joint effort among BART, MTC and SamTrans is underway to earmark federal funds for the West Bay Extensions which include Colma and San Francisco Airport. Federal funds have been identified in the regional new starts financial plan as the potential primary funding source for the West Bay Extensions. State funds in the amount of $229 million have been committed to BART extensions by the California Transportation Commission (CTC) in a 1988 resolution and prior actions. By voter approval, county funds and bridge tolls have likewise been committed to BART extensions. BART is contributing $157 million to extensions in cash and property for Phase I Construction and Phase II Planning and Rights-of-Way acquisition. Also included in the $157 million is a $15 million contribution to the Muni Metro project and $45 million to be applied toward inflation of the total Extensions Program. A successful effort to earmark federal funding would secure the last critical piece in the extensions funding puzzle.

Chapter One briefly discussed the importance of the BART/SamTrans agreement to the Extensions Program. In this agreement, SamTrans agreed to make a $200 million contribution which will be available for East Bay extensions. The total Extensions Program is contingent upon the successful funding of the West Bay extensions with federal funds and the SamTrans payment of $200 million to BART. If successful, and other assumptions are realized, the federal earmark will complete the funding for the entire Phase I Extensions Program.

Project Status

As discussed above, Figure 6 shows the status of Phase I Extensions. This figure describes how many stations per extension will be built, how many miles are in the extension, identification of funding sources, and a brief description of the status of each project. Figure 7 shows the cost by task for each extension project and the estimated amount that has been expended through June 30, 1989.

The state final environmental impact report (FEIR) for North Concord-West Pittsburg has been completed, and the FEIR for Dublin-Pleasanton is scheduled for completion in the Spring of 1989. Preliminary engineering and design is underway for both projects. The draft state environmental impact report (DEIR) and preliminary engineering for Irvington-Warm Springs are scheduled to begin in Summer 1989.

The West Bay Extensions are programmed with federal sources. Therefore, these projects must satisfy federal environmental requirements. The Colma Station DEIS/DEIR was completed in December 1988 and the FEIR/FEIS is scheduled to begin in Summer 1989. The AA/DEIS/DEIR for the San Francisco Airport Extension is scheduled to begin in Summer 1989.

Construction for the Dublin-Pleasanton and Colma Extensions is scheduled to start in 1991. Bay Area residents will get a first look at their investment in the Extensions Program as construction begins on these projects. The North Concord-West Pittsburg and Irvington-Warm Springs extensions are also scheduled to start construction in 1991.

The maps that follow show the proposed rights-of-way for Phase I Extensions. These routes are tentative until preliminary engineering is completed for each project.

Extensions Park/Rides

During the five-year period, four park/ride lots will be constructed on future proposed BART station sites. These four proposed park/ride lots are Somersville Road, Railroad Avenue, West Livermore and Hercules.

FIGURE 6

EXTENSIONS STATUS
PHASE I PROJECTS

	STATIONS	MILES	FUNDING SOURCES	PROJECT STATUS
North Concord - West Pittsburg	2	7.8	State Bridge Tolls Contra Costa County SamTrans BART	FEIR Completed (11/88) Preliminary Engineering/ Design Underway Construction completed in 1997
Dublin - Pleasanton	2	12	State Bridge Tolls Alameda County BART	DEIR Underway Preliminary Engineering/ Design Underway Construction completed in 1995
Irvington - Warm Springs	2	5.4	State Bridge Tolls SamTrans BART	DEIR to Begin Summer 1989 Construction completed in 1997
S. F. Muni Metro Extension	TBD	TBD	BART	S. F. Project Lead
Colma Station	1	0.9	UMTA SamTrans State	DEIR/DEIS Completed 12/88 FEIR/FEIS to begin Summer 1989; Construction completed in 1995
San Francisco Airport	3	6.2	UMTA SamTrans State	AA/DEIS/DEIR to Begin Summer 1989 Construction completed in 2000
TOTAL	10	32.3		

11-Jul-89

FIGURE 7

EXTENSIONS FINANCE PLAN - BY CORRIDOR & TASK
PHASE I &
PHASE II PLANNING/ROW

$ X 000

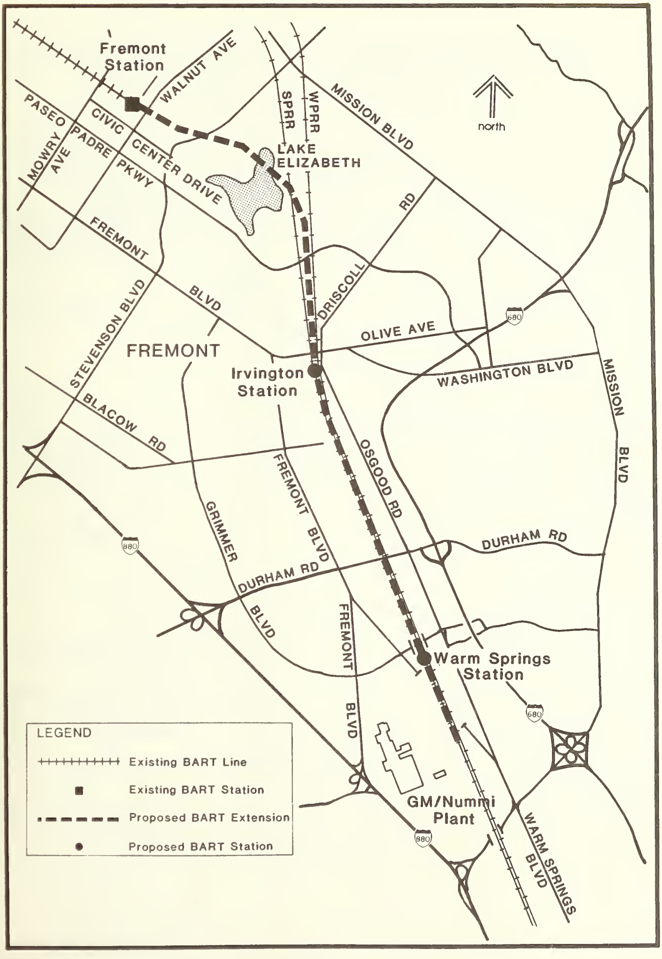
	PE & ENGINEERING	ROW & AGREEMENTS	PROCUREMENT & CONSTRUCTION	TOTAL		AMOUNT EXPENDED THROUGH JUNE 30, 1989
N. CONCORD - W. PITTSBURG	$64,226	$20,870	$339,904	$425,000		$13,770
IRVINGTON - WARM SPRINGS	$55,553	$22,200	$292,247	$370,000		$20,300
DUBLIN - PLEASANTON	$32,022	$16,260	$183,318	$231,600		$15,720
COLMA	$12,060	$1,590	$76,850	$90,500		$200
SAN FRANCISCO AIRPORT	$78,700	$27,600	$393,700	$500,000		$0
SAN FRANCISCO MUNI				$15,000		$0
PHASE II PLANNING & ROW				$81,099		$7,928
SUBTOTAL	$242,561	$88,520	$1,286,019	$1,713,199		$57,918
BART CONTRIBUTION TO EXTENSIONS INFLATION CONTINGENCY				$45,000		
GRAND TOTAL	$242,561	$88,520	$1,286,019	$1,758,199	$0	$57,918

1987 DOLLARS

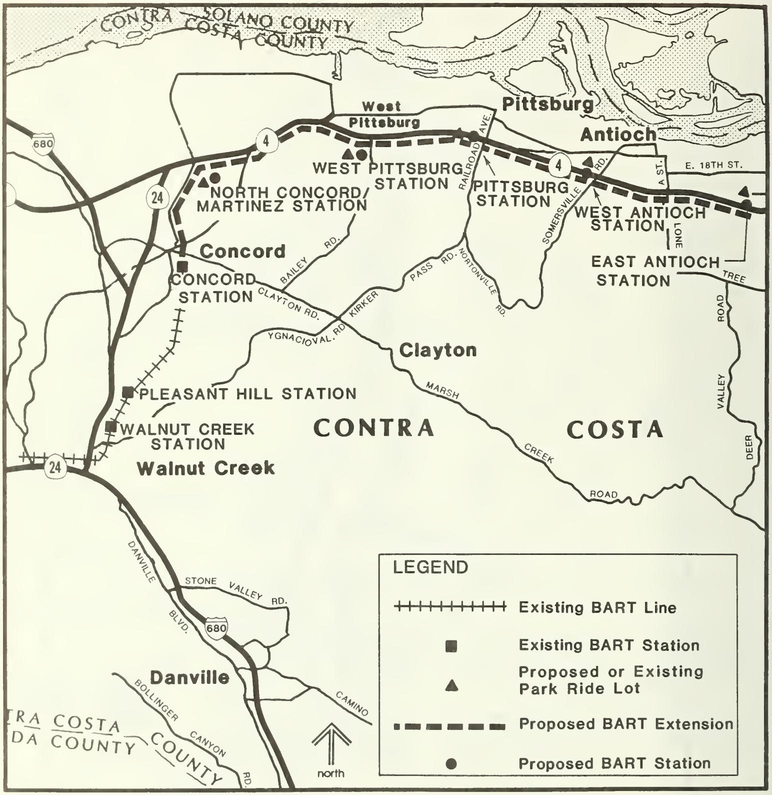
11-Jul-89

WARM SPRINGS EXTENSION

Inside Current District Phase I

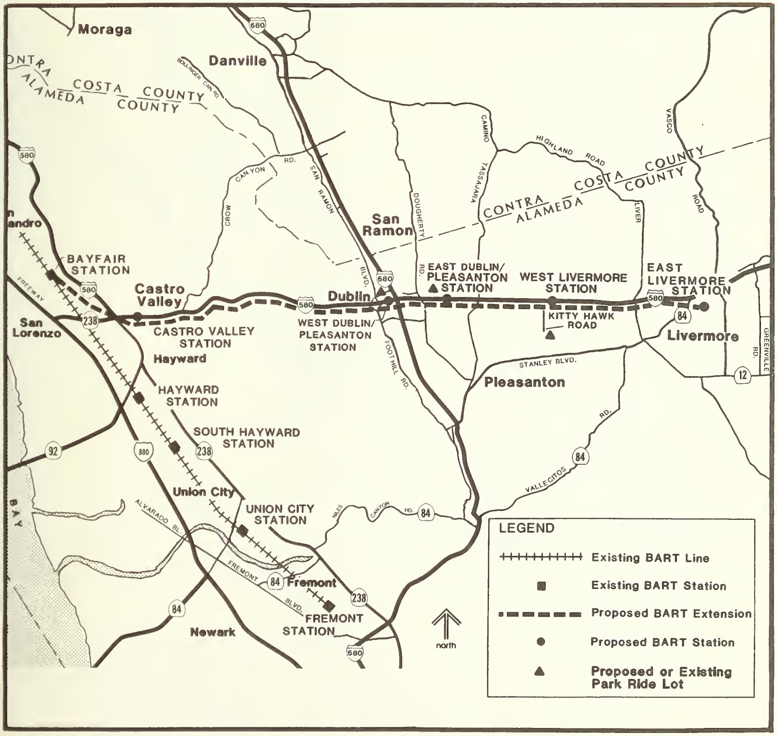


BART PITTSBURG – ANTIOCH EXTENSION
Inside Current District Phases I and II

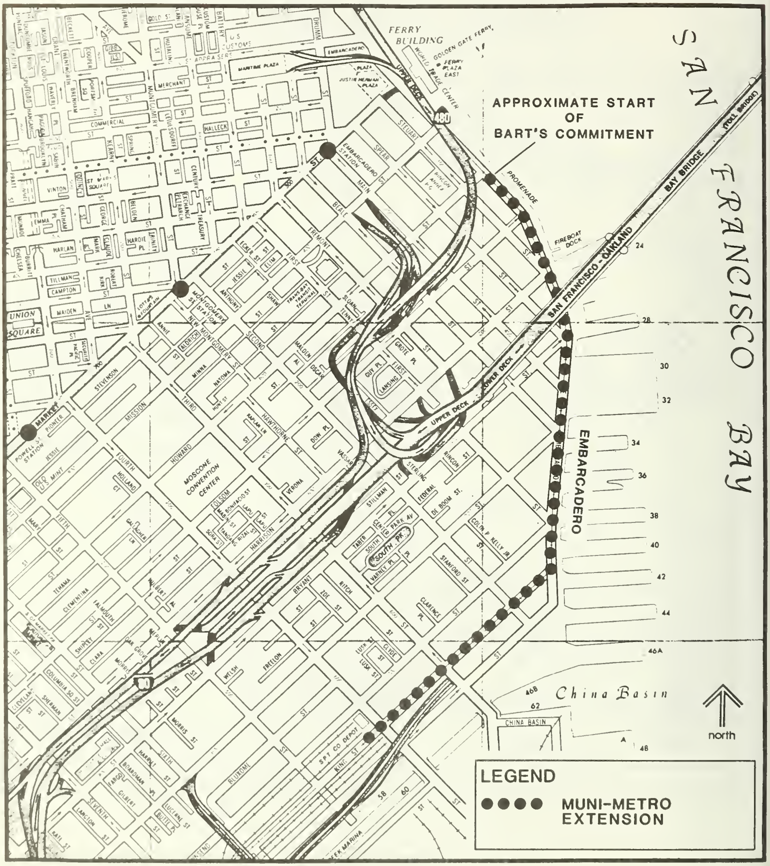


LIVERMORE–PLEASANTON EXTENSION

Inside Current District Phase I and II

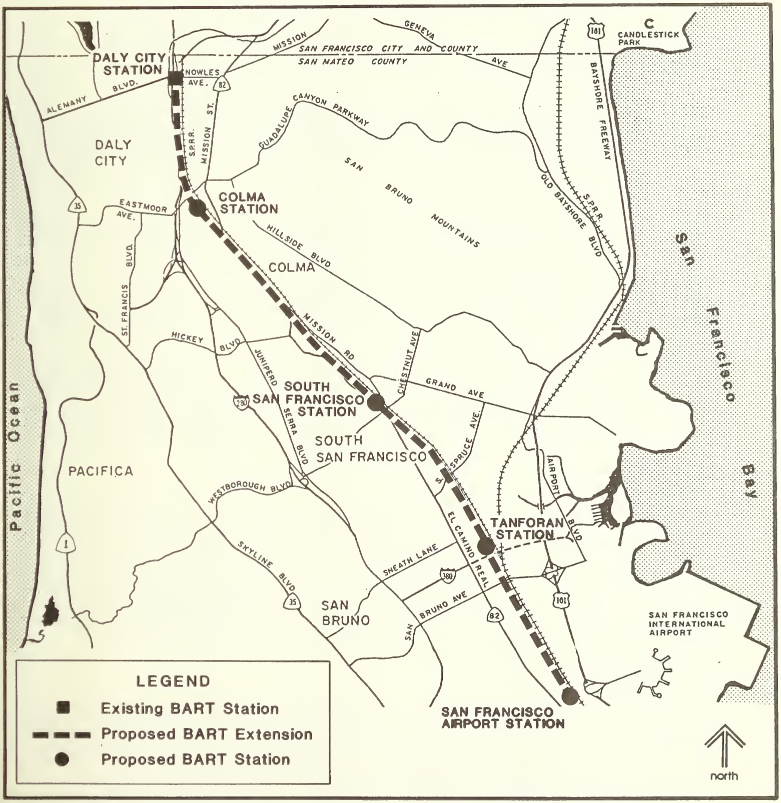


SAN FRANCISCO COMMITMENT
(Muni-Metro Extension)
Inside Current District Phase I



SAN FRANCISCO AIRPORT EXTENSION

Outside Current District Phase I



STATION ACCESS PROJECTS

A key element to achieving success in the implementation of the Capacity Expansion Program is providing sufficient patron parking at BART stations. Figure 8 summarizes the BART Access Program and its funding status. There are over 27,000 existing patron parking spaces throughout the District. This inventory of parking spaces includes parking expansion projects that have provided approximately 7,000 additional spaces over the past several years as shown in Figure 9.

The current systemwide parking shortage is estimated at 11,700 spaces. The current parking shortage is estimated to cost the District over $10 million per year in lost revenue due to inaccessibility. After the Capacity Expansion Program is implemented and additional rail capacity is available, the revenue loss will be even greater.

BART proposes to add 10,583 more spaces by the end of the five-year period. When all planned parking projects are completed, including projects beyond the five-year period, there will be a total of 41,808 parking spaces systemwide.

The total cost of the Access Program is approximately $217 million. Of that amount, $58 is funded, $76 million is programmed for funding from identified fund sources, and $83 million is unfunded and no fund source has been identified.

Additional parking will be necessary to maximize rail-revenue and patron convenience even as bus and carpool access increases. In future years, BART anticipates substantially higher numbers of patrons arriving at stations by all modes, including autos. BART also anticipates that most of the BART patrons who will utilize expanded parking facilities will be new BART riders drawn from regional freeway commutes and other congested auto arteries.

Pleasant Hill Station

After many years of negotiating with the State Department of Transportation over funding, environmental review and design, BART is set to break ground in Fall 1989 for a multi-level parking facility at the Pleasant Hill Station. This will be the first multi-level parking facility to be constructed in the East Bay and the only one built since the construction of the Daly City Station parking facility in 1976. This project will provide approximately 1200 additional parking spaces at Pleasant Hill. The possibility of future joint development at this site has been taken into consideration in the project design.

Access Improvements Projects

In cooperation with AC Transit and the Central Contra Costa Transit Authority, BART has targeted five BART station sites for improved bus and automobile access projects. The five station sites are Fruitvale, Hayward, El Cerrito del Norte, Walnut Creek and Concord. The proposed projects will replace existing bus-interface facilities and patron parking on neighborhood streets. Where possible, BART will coordinate construction of parking facilities and transit improvements with the need to maintain, repair, and rehabilitate existing access facilities.

Three of these projects support AC Transit capital plans to restructure routes which will bring more buses to BART stations. Station transfer facilities are currently inadequate to meet these increased needs. In addition, BART and AC Transit are cooperating in the development of transfer centers at eleven other BART stations. CCCTA likewise anticipates a need for improved transfer facilities in the future.

The station access projects include transit coordination improvements such as sheltered walkways and waiting areas for bus transfers; improved signage and transit information; adequate bus bays for increased numbers of simultaneous off-loadings and boarding; and fast, safe station area circulation for these buses. These projects will provide more convenient and attractive service for existing and future BART/bus patrons. A drawing of each of the five joint projects follows Figure 9.*

---

* NOTE: The bus intermodal facilities shown are preliminary and conceptual. All proposed improvements may be modified to accommodate approved and future joint development plans.

FIGURE 8

STATION ACCESS PROGRAM OVERVIEW
(PARKING COMPONENT)

FMS#	STATION ACCESS PROJECTS	CURRENT PARKING SPACES	5-YR PARKING SPACES	PARKING BEYOND 5-YEARS	TOTAL PLANNED PARKING	SURFACE LOT	FACILITY	LAND PURCHASE REQUIRED	FILLED DURING AM PEAK	FUNDING STATUS***
0--&	PARKING PRODUCTIVITY IMPROVEMENTS	SEE NOTE (1)								F
01EE	LAKE MERRITT STATION ACCESS IMPVTS	190		400	590		XX		XX	U
01GG	ALAMEDA PARK/RIDE	0		100	100	XX		XX		F
01GH	FRUITVALE ACCESS IMPROVEMENTS	1,025	560		1,585		XX			P
01MH	BAYFAIR STATION ACCESS IMPROVEMENTS	1,761		600	2,361		XX			U
010F	HAYWARD SURFACE LOT EXPANSION	967	950		1,917	XX		XX		F
010G	HAYWARD ACCESS IMPROVEMENTS	*	*		0		XX			P
01VG	UNION CITY SURFACE LOT EXPANSION	1,166	300		1,466	XX		XX	XX	F
	ALAMEDA COUNTY LINE SUBTOTALS	5,109	1,810	1,100	8,019					
03EB	ROCKRIDGE STATION ACCESS IMPROVEMENTS	776	550	500	1,826		XX		XX	F
03HG	ORINDA STATION ACCESS IMPROVEMENTS	1,320		500	1,820		XX		XX	U
03JG	LAFAYETTE STATION ACCESS IMPROVEMENTS	1,446		700	2,146		XX		XX	U
03LG	WALNUT CREEK ACCESS IMPROVEMENTS	1,263	1,385		2,648		XX		XX	P
03LJ	WALNUT CREEK SURFACE LOT RESTRIPING	*			*	XX			XX	U
03NE	PLEASANT HILL PARKING FACILITY- EXPAND	1,778	1,393		3,171		XX		XX	F
03NG	PLEASANT HILL PARKING FACILITY-REPLACMNT	*			*		XX		XX	U
03NJ	PLEASANT HILL SURFACE LOT RESTRIPING	*			*	XX			XX	F
03SH	CONCORD RPL. PKG. & ADDITIONAL CAPACITY	1,912	1,735		3,647		XX		XX	F
03SN	CONCORD ACCESS IMPROVEMENTS	*			*		XX		XX	P
04RA	BRENTWOOD PARK/RIDE	0	100		100	XX				P
	CONCORD LINE SUBTOTALS	8,495	5,163	1,700	15,358					
05KH	EL CERRITO DEL NORTE PARKING FACILITY	1,607	1,960		3,567		XX		XX	F
05KI	EL CERRITO DEL NORTE ACCESS IMPROVEMENTS	*			*				XX	P
07GH	MACARTHUR STATION ACCESS IMPROVEMENTS	609		640	1,249		XX		XX	U
	RICHMOND LINE SUBTOTALS	2,216	1,960	640 0	4,816					
11EH	WEST OAKLAND SURFACE LOT EXPANSION	403	1,100		1,503	XX			XX	U
11EG	WEST OAKLAND STATION PKG EXPANSION	*			*				XX	U
11UB	DALY CITY INTERMODAL**									
	SAN FRANCISCO LINE SUBTOTALS	403	1,100	0	1,503					
	TOTALS	16,223	10,033	3,440	29,696					
	TOTAL STATIONS WITH NO NEW PROJECTS	10,559	0	0	10,559					
	TOTAL EXTENSION STATION PARK/RIDES	1,003	600	0	1,603	XX		XX		
	GRAND TOTALS	27,785	10,633	3,440	41,858					

NOTE 1: PROJECT INVOLVES RESTRIPING VARIOUS STATION PARKING LOTS - 10-20% PROJECTED PARKING INCREASE.
* MULTIPLE PROJECTS PLANNED - CURRENT AND PROJECTED TOTAL PARKING SPACES ARE SHOWN ONLY ONCE.
** ENHANCES STATION ACCESS FOR BUSES; EXPANDS PATRON ACCESS AND TICKETING AMENITIES.

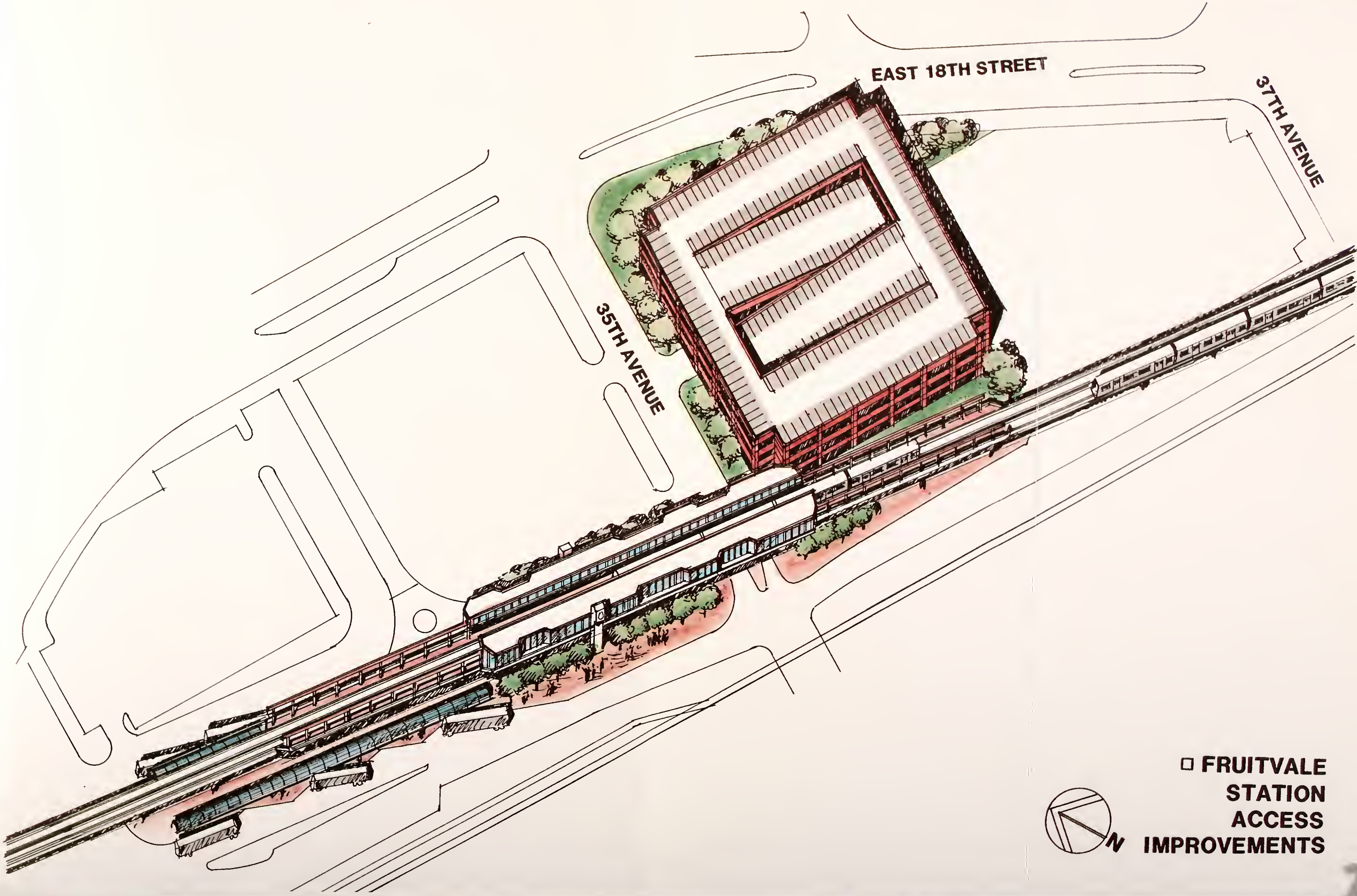
***		
F - FUNDED	AMOUNT FUNDED: $58 MILLION	
P - PROGRAMMED, FUNDS NOT YET APPROVED	AMOUNT PROGRAMMED: $76 MILLION	
U - FUNDING NOT IDENTIFIED	AMOUNT OF UNIDENTIFIED FUNDS: $83 MILLION	12-Jul-89

FIGURE 9

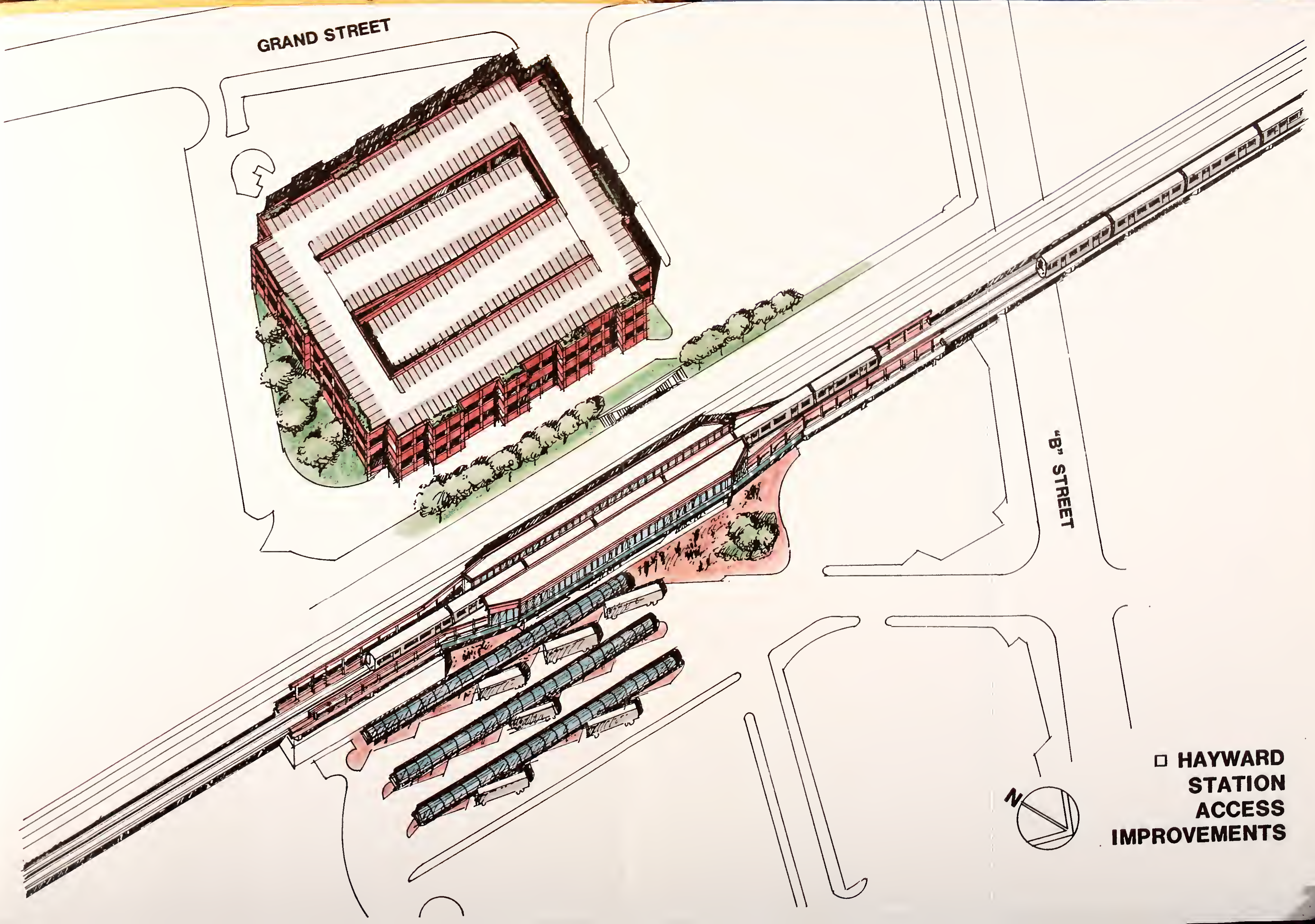
PARKING PROJECT HISTORY

COMPLETED PROJECTS

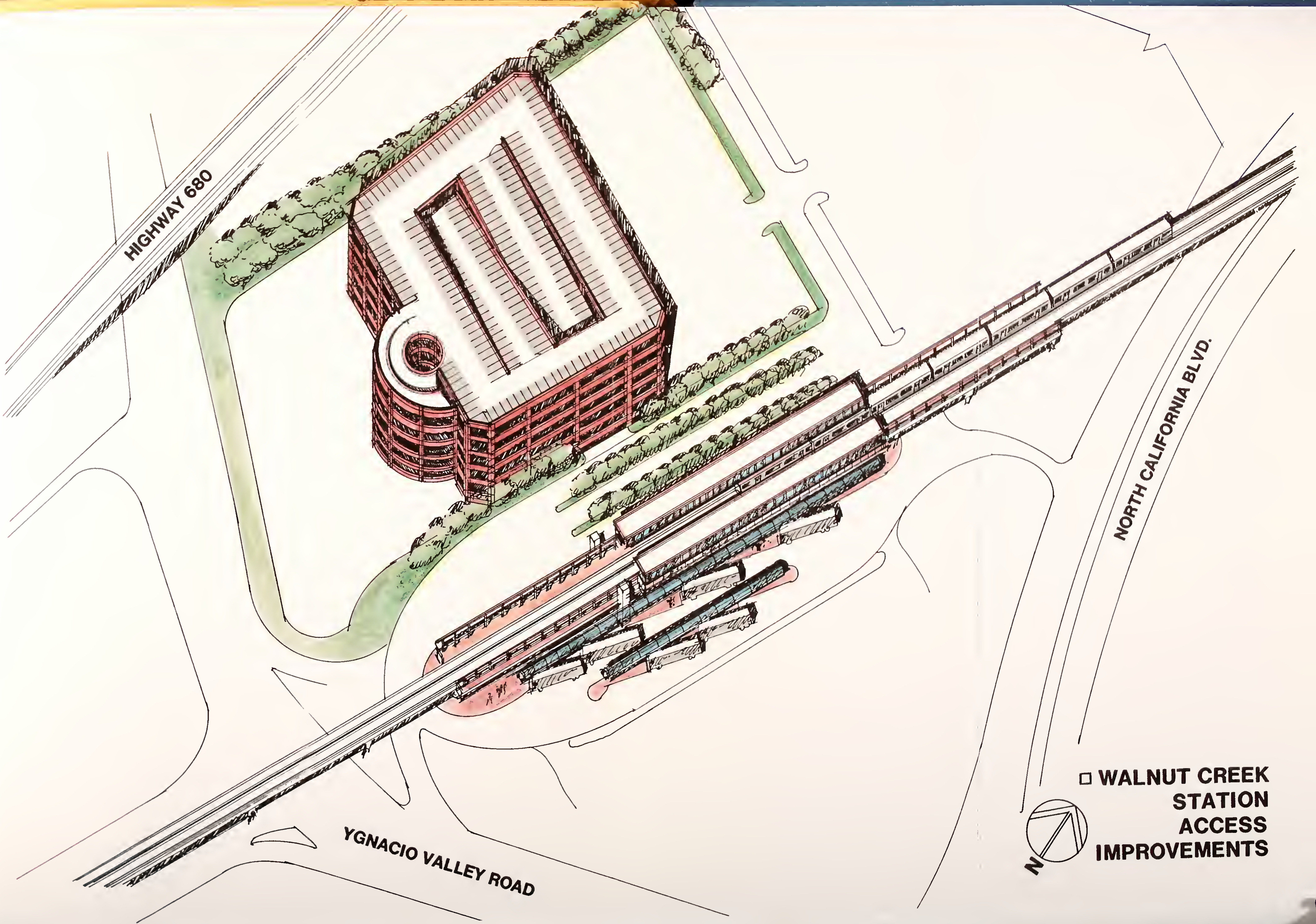
STATION NAME	FMS #	PROJECT DESCRIPTION	SPACES
FREMONT	01XD	FREMONT TEMP IMPS/CALTRANS LOT (II)	685
FREMONT	01XG	FREMONT PERM IMPS/CALTRANS LOT (I)	718
FREMONT	01XM	FREMONT 1986 PARKG LOT REDESIGN	391
CONCORD	03SD	CONCORD SACTO. NO. RR ROW PKG LOT (I)	444
CONCORD	03SL	CONCORD 1984 RESTRIPING & IMPVTS	204
LAFAYETTE	03JM	LAFAYETTE 1987 PARKG LOT REDESIGN	213
LAFAYETTE	03JE	LAFAYETTE PERM IMPVT/CALTRANS LOT (I)	403
MACARTHUR	07GD	MACARTHUR REDUCE LOT ROW SPACG (III)	105
GLEN PARK	11MB	GLEN PARK MIDDAY/KISSRIDE PKG LOT (I)	58
LAKE MERRITT	01EF	LAKE MERRITT LEASEHOLD IMP. CALTRANS PKG	120
UNION CITY	01VK	UNION CITY 1983 RESTRIPING & IMPVTS	234
NORTH BERKELEY	05GB	NORTH BERKELEY SURFACE LOT EXPANSION	252
EL CERRITO DEL NORTE	05KL	DEL NORTE 1984 RESTRIPING & IMPVTS	514
BAY FAIR	01ML	BAY FAIR 1984 RESTRIPING & IMPVTS	293
SOUTH HAYWARD	01QL	SO. HAYWARD 173-SP PKG EXPAN/PH I (IV)	199
NOT A STATION	04MA	HILLCREST PARK/RIDE LOT - 200 SP	252
SOUTH HAYWARD	01QE	SO. HAYWARD 173-SP PKG EXPAN/PH I (IV)	173
NOT A STATION	04DA	NORTH CONCORD BUS STATN PARKRIDE LOT (XR)	538
NOT A STATION	04GA	BAILEY RD PARK/RIDE LOT - 200 SP	213
ORINDA	03HM	ORINDA 1987 PARKG LOT REDESIGN	232
FRUITVALE	01GM	FRUITVALE 1986 PARKG LOT REDESIGN	238
SAN LEANDRO	01KM	SAN LEANDRO 1986 PARKG LOT REDESIGN	160
VARIOUS		503 NEW SPACES - ELIMINATE RED CURBS	503
		TOTAL SPACES	7,142



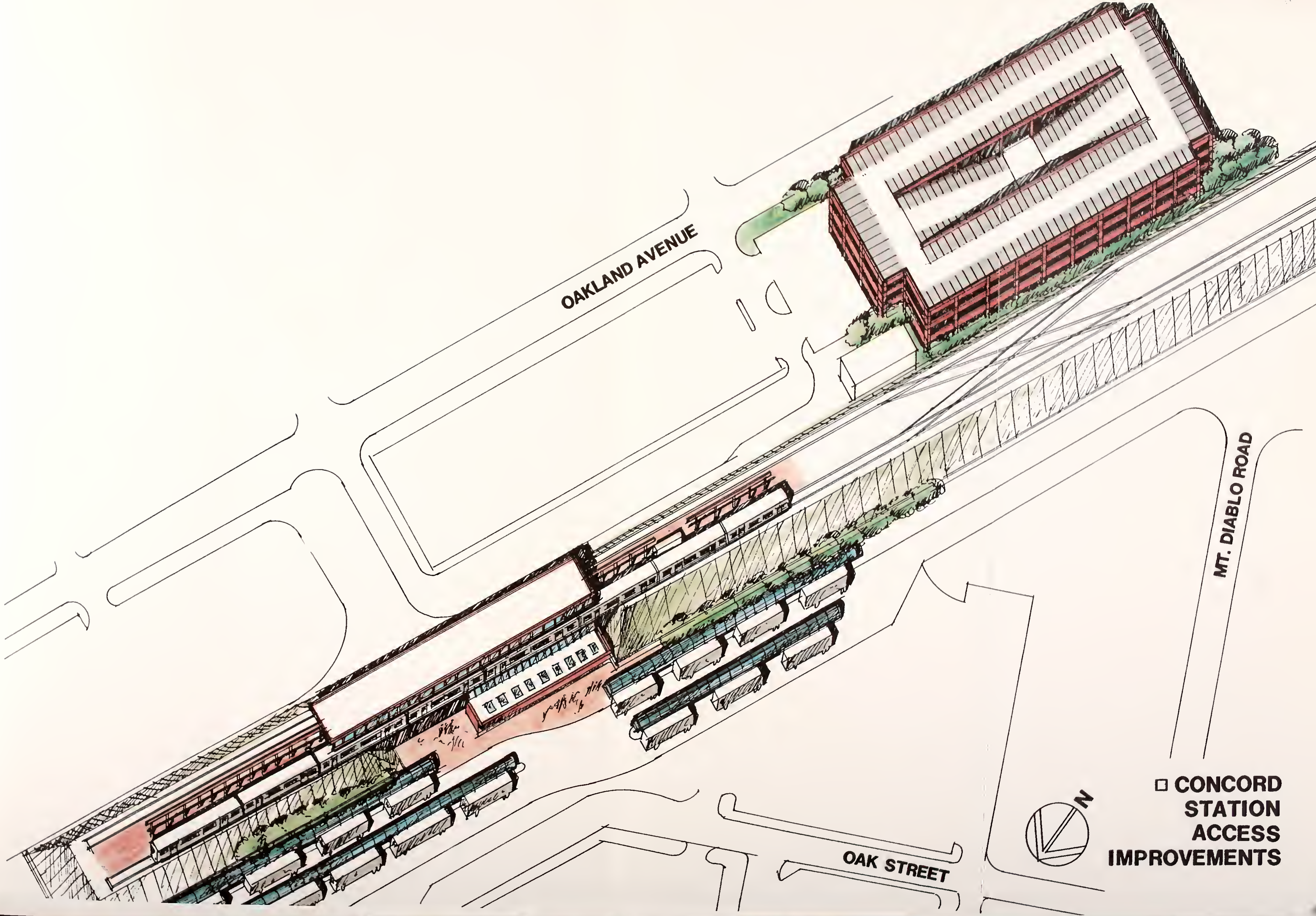
□ FRUITVALE STATION ACCESS IMPROVEMENTS



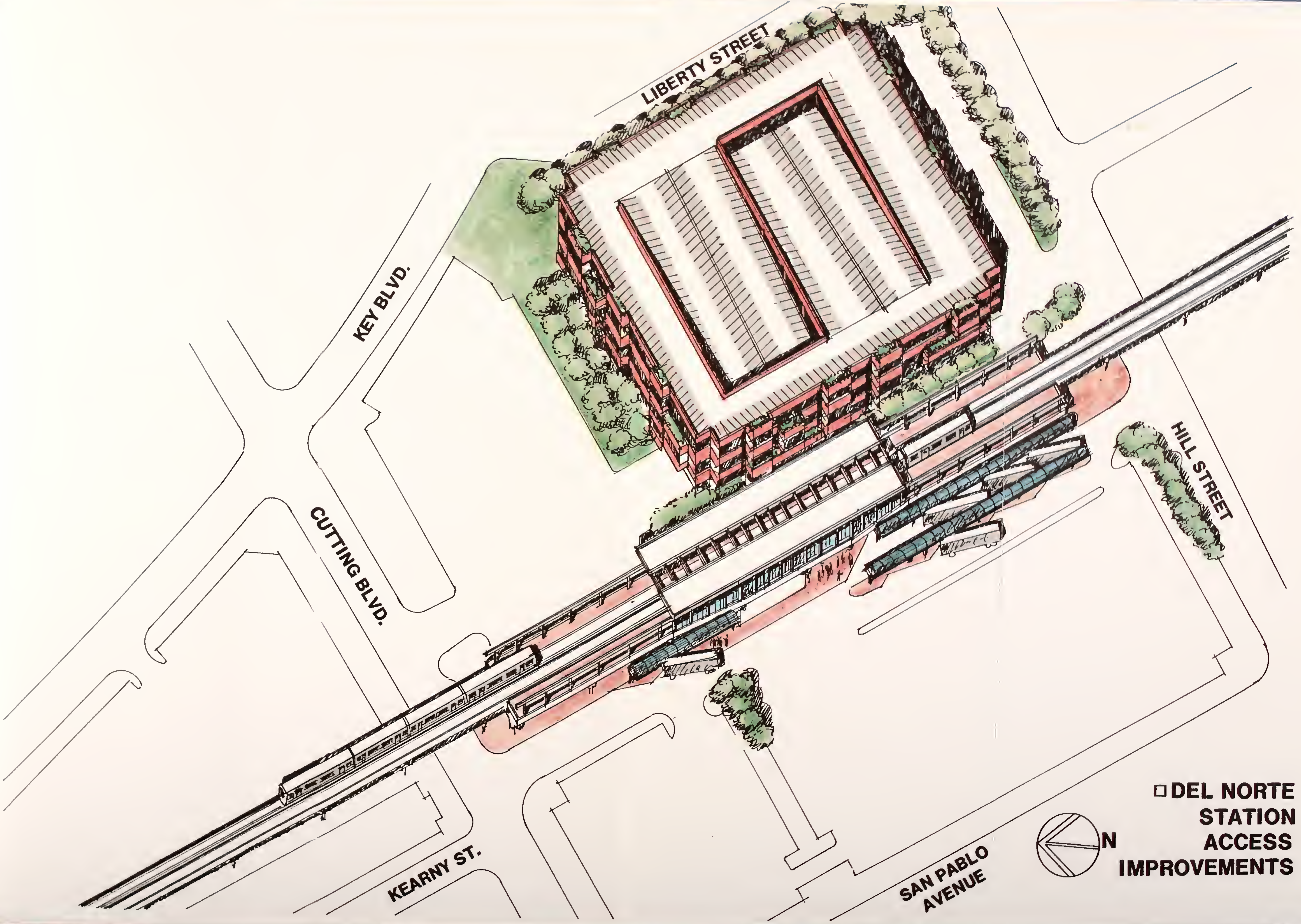
□ **HAYWARD STATION ACCESS IMPROVEMENTS**



☐ **WALNUT CREEK STATION ACCESS IMPROVEMENTS**



☐ CONCORD STATION ACCESS IMPROVEMENTS



□ DEL NORTE STATION ACCESS IMPROVEMENTS

CAPACITY EXPANSION

The Capacity Expansion Program, which has been underway for several years, is 99% funded. The unfunded portion of this program consists of several small projects that enhance the benefits of the program. The purpose of this program is to expand service on the existing BART system. When complete, this program will decrease the intervals between trains, increase the number of trains on the system and increase the number of cars on each train. Train service will increase as specific stages of the program are completed. Each stage of the program is detailed in Figure 10.

The Capacity Expansion Program is composed of twenty projects, two of which have been completed. Figure 11 lists these projects and their funding status. The completed projects are no longer included in the projected five-year financial plan, therefore, they are not included in the total CIP cost. These completed projects are included here because they are an integral part of the major system expansion program.

The two completed projects are: the Fire Hardening project that reinforced the transit vehicle with fire retardant materials in the floors, walls, ceilings and seat cushions; and the KE Track which involved the installation of a third track through downtown Oakland and provided greater operational flexibility at a point in the system where all lines converge as well as provided for additional storage capacity.

There are currently 45 trains that run during the morning and evening commute. The next service expansion to result from this program is scheduled for November 1989 when the total number of trains on-line will be 51. This increment will be possible mainly because of the completion of the Daly City Turnback. Final implementation of the Capacity Expansion Program is scheduled for September 1993. At that time, there will be 58 trains during peak-hour service operating with minimum scheduled headways of two minutes and fifteen seconds.

FIGURE 10

BART CAPACITY EXPANSION PROGRAM
STATUS AS OF MARCH 1989
Target Dates May Be Altered By Changes In Project Completion Schedules

04/12/89

Minimum Headway Capability (Min:Sec)	Projects Required To Achieve or Support This Headway	Anticipated Project Completion Dates	Target Expanded Service Start Dates	Peak Hour Trains Peak Direction Transbay	Peak Period Capacity Trains		Peak Period On-Line Cars	Spare Cars	Total Cars Required	Available Fleet (Extra)	Fleet Accepted by Engineering	
3:45	Current Service	---	Nov 86	17	45	A C B T	90 8 248 346	14 2 24 40	104 10 272 386	114 (+10) 10 272 396 (+10)	136 48 303 487	A C B T
	47 C-Cars Available for Operations	Jul 89										
	Daly City Turnback	Jul 89	Aug 89	17	48	A C B T	96 42 243 381	14 2 24 40	110 44 267 421	114 (+4) 44 272 (+5) 431 (+9)	136 83 303 522	A C B T
3:10	58 C-Cars Available for Operations	Oct 89	Nov 89	19	51	A C B T	100 52 248 400	14 6 24 44	114 58 272 444	114 58 272 444	136 98 303 537	A C B T
2:30	New On-Board ATC (A-Car Retrofit)	Jul 89										
	Daly City Yard	Sep 89										
	M-87 Interlocking	Nov 89										
	Wayside Train Control/System Performance Mods	Jun 90										
	Electrical Capacity Increase: - Procure/Install Substation	Sep 90										
	101 C-Cars Available for Operations	Sep 90	Oct 90	23	52	A C B T	100 91 232 423	14 10 30 54	114 101 262 477	114 101 272 (+10) 487 (+10)	136 150 303 589	A C B T
2:15	Brake Rate Algorithm Modifications	Mar 91										
	104 C-Cars Available for Operations	Mar 91	Apr 91	26	55	A C B T	100 94 239 433	14 10 30 54	114 104 269 487	114 104 272 (+3) 490 (+3)	136 150 303 589	A C B T
	ICS	May 90										
	120 C-Cars Available for Operations	Sep 92	Oct 92	26	58	A C B T	100 110 242 452	14 10 30 54	114 120 272 506	114 120 272 506	136 150 303 589	A C B T
	128 C-Cars Available for Operations	Jul 93	Sep 93	26	58	A C B T	100 118 242 460	14 10 30 54	114 128 272 514	114 128 272 514	136 150 303 589	A C B T

FIGURE 11

CAPACITY EXPANSION & RELATED PROJECTS
$ 000

FMS #	PROJECTS	FUNDED	UNFUNDED	TOTAL
	CAPACITY EXPANSION PROJECTS			
11—	DALY CITY TURNBACK & YARD	$147,566	$0	$147,566
11TD	DALY CITY SHOP	$7,912	$0	$7,912
15EG	ELECTRICAL CAPACITY IMPROVEMENTS	$7,675	$0	$7,675
20—	WAYSIDE TRAIN CONTROL & SYSTEM PERF. MODS	$14,929	$0	$14,929
41GB	2D GENERATION ATO/138 A-CAR SETS	$15,547	$0	$15,547
42—	150 NEW TRANSIT VEHICLES & ATO	$228,298	$0	$228,298
61—	INTEGRATED CONTROL SYSTEM - ICS	$39,213	$0	$39,213
	SUBTOTAL	$461,140	$0	$461,140
	RELATED PROJECTS			
21BB	HAYWARD YARD IMPROVEMENTS	$400	$0	$400
22BB	CONCORD YARD IMPROVEMENTS	$285	$0	$285
23BB	RICHMOND YARD IMPROVEMENTS	$485	$0	$485
41KD	A-CAR ELECTRONIC TRAIN DESTINATION SIGNS	$570	$0	$570
65DB	CONSIST DATA-MARIS/ICS EXCH.	$124	$0	$124
OXXX	ADDITIONAL TRACK AT OKS	$0	$400	$400
PXXX	CONSTRUCT TRAIN OPERATOR OVERPASSES	$0	$600	$600
QXXX	CASH HANDLING BUILDING EXPANSION	$0	$1,200	$1,200
99*73	C-CAR START-UP	$2,000	$0	$2,000
99*75	SYSTEM PERFORMANCE STUDY JUSTIFIED PROJECTS	$14,000	$0	$14,000
99*81	SYSTEM PERFORMANCE STUDY JUSTIFIED PRJCTS-II	$1,020	$0	$1,020
99*84	DALY CITY COMPLETION CONTINGENCY	$5,400	$0	$5,400
	SUBTOTAL	$24,284	$2,200	$26,484
	COMPLETED PROJECTS			
07—	KE TRACK	$24,000	$0	$24,000
41E-	VEHICLE FIREHARDENING	$20,800	$0	$20,800
	SUBTOTAL	$44,800	$0	$44,800
	GRAND TOTAL	$530,224	$2,200	$532,424

11-Jul-89

CURRENT DOLLARS

BASIC SYSTEM

The Basic System Program is the backbone of the BART system and is composed of projects that maintain the basic 72-mile infrastructure, satisfy system safety requirements, and enhance system efficiency. This year in evaluating the requirements for the CIP, a comprehensive review was undertaken to identify all projects to be included in the total program. Approximately 65 new projects were identified. This increase in need for capital investment on the Basic System is an outgrowth of the fact that the BART system is nearly 20 years old and is beginning to require rehabilitation. Most of these new projects fell into the Basic System Program.

The single largest project in this program is the procurement of new transit vehicles. This procurement is necessary to support basic operations once Phase I Extensions are brought on line.

The unfunded portion of the Basic System Program is primarily programmed in FY 1993/94 with federal funds. BART anticipates that federal funds will be available in five years to fund a large portion of this unfunded program. The majority of the funded portion of the program is funded with BART reserves and, to a lesser degree, federal and state funds.

Figure 12 is a listing of each project and its funding status.

FIGURE 12

BASIC SYSTEM PROJECTS
$ 000

FMS#	PROJECTS	FUNDED	UNFUNDED	TOTAL
01—	DISTRICT ROOF REPLACEMENT	$364	$1,336	$1,700
(01RM, 03PH & 05NF)	TRAIN OPERATOR BREAK ROOM MODS	$841	$0	$841
01SO	CONSOLIDATE COMPONENT REPAIR SHOP	$254	$0	$254
01SR	WOMEN'S RESTROOM, LOCKERS & SHOWERS-OHY	$88	$0	$88
01VL	UNION CITY INFRASTRUCTURE IMPROVEMENTS	$0	$286	$286
01XL	FREMONT INFRASTRUCTURE IMPROVEMENTS	$0	$137	$137
03CH	34.5KV SUBTRANSMISSION LINE MODS	$98	$0	$98
03FM	WET STANDPIPES-BERKELEY HILLS TUNNEL	$2,245	$0	$2,245
03RB	PATRON EXITING MODIFICATIONS-CONCORD STATION	$136	$55	$191
07DB	RENOVATE LOST & FOUND FACILITY	$38	$0	$38
11DB	SECOND STAIRWAY-WEST OAKLAND PLATFORM	$729	$0	$729
11FG	2 END STAIRWAYS-PLATE/MEZZ-EMS	$852	$0	$852
11HE	REPLACE LINE SUMP PUMPS	$42	$0	$42
15AZ	WET STANDPIPES & FIRE CONNCECTIONS-21 STATIONS	$3,651	$0	$3,651
15BG	PIGEON CONTROL	$101	$0	$101
15BH	DRY STANDPIPES - SUBWAY	$9,210	$0	$9,210
15CN	RAIL REPLACEMENT	$800	$0	$800
15LC&	ESCALATOR REHABILITATION PROGRAM	$6,082	$0	$6,082
15RB	STATION ENTRANCE CANOPYS	$457	$7,193	$7,650
15SA	UNDERGROUND STORAGE TANK MONITORS	$120	$0	$120
17DC	REPLACE UNDERGROUND FUEL TANKS	$284	$0	$284
20AC	ELIMINATE STATION INTERFACES	$2,400	$0	$2,400
20HB	STATION BACKUP POWER	$2,486	$0	$2,486
21EB&	YARD EFFICIENCY MODIFICATIONS	$319	$0	$319
27OC	RADCOM MODS - CENTRAL CONTROL	$1,750	$0	$1,750
41BU	REINSTALL 6TH CAPACITOR & MOD OVERLOAD RELAY	$163	$0	$163
41EM	COUPLER PINS & SOLENOID VALVES	$145	$0	$145
41JJ	BATTERY OVERTEMPERATURE SENSOR	$181	$0	$181
44—	REGIONAL MULTI-OPERATOR PASS	$5,809	$2,269	$8,078
45AN	MULTI-DENOMINATIONAL BILL VALIDATORS	$197	$0	$197
45BF	IBM TICKET TRANSPORT RETROFIT	$1,675	$0	$1,675
47BA	NINE VENDORS & EIGHT ADDFARES-2D GENERATION	$0	$1,319	$1,319
59CN	STATION TRAIN APPROACH MONITOR	$25	$0	$25
59DD	RTA INFORMATION CENTERS	$28	$0	$28
65ED	PLANNING INFORMATION PROCESS NETWORK	$0	$354	$354
65HC	ENGINEERING & CONSTRUCTION MIS	$0	$325	$325
65NB	C & CR AFC RELIABILITY REPORTING	$100	$0	$100
68CD	REPLACE CHILDERS COIN SORTERS	$60	$0	$60
68DE	FOUR (4) TRACTOR/TRAILER ARMORED TRUCKS	$386	$0	$386
79A1	REPLACEMENT MAINT. EQUIP. & SERVICE VEHICLES	$3,821	$955	$4,776
79A2	REPLACE MAINT. EQUIP. & SERVICE VEHICLES	$0	$1,081	$1,081
79B-	REPLACE OVERAGE SEDANS & MAINT. VEHICLES	$290	$0	$290
79KB	TRAIN OPERATOR MEGAPHONES	$43	$0	$43
79MP	RAIL GRINDER	$992	$0	$992
93DP	INVENTORY BUILDUP	$23,407	$0	$23,407
98AA	LEGAL & ADMINISTRATIVE SERVICES-GENERAL	$110	$0	$110
	SUBTOTAL	$70,779	$15,310	$86,089

FIGURE 12 (Cont'd)

BASIC SYSTEM PROJECTS
$ 000

FMS#	PROJECTS	FUNDED	UNFUNDED	TOTAL
AAXX	REPLACE 15 ELECTRIC CARTS IN YARDS	$0	$120	$120
AXXX	REPLACE STATION FIRE ALARMS	$0	$300	$300
BBXX	REPLACE ELECTRIC CART BATTERY CHARGERS	$0	$25	$25
BXXX	ADDITIONAL POLICE RADIO CHANNEL	$0	$500	$500
CCXX	REPLACE REVENUE VEHICLE WHEEL PRESS	$0	$365	$365
CXXX	RAIL REPLACEMENT - 1994	$0	$3,000	$3,000
DDXX	REPLACE LINE PUMPS SYSTEMWIDE	$0	$539	$539
DXXX	REPLACE RAIL LUBRICATORS SYSTEMWIDE	$0	$30	$30
EEXX	REPLACE SEWAGE PUMPS	$0	$270	$270
EXXX	REPLACE INSULATED JOINTS SYSTEMWIDE	$0	$40	$40
FFXX	REPLACE LIGHT FIXTURES-TBT LOWER GALLERY	$0	$150	$150
FXXX	REPLACE DIRECT FIXATION RAIL FASTENERS	$0	$100	$100
GGXX	REPLACE/REFURBISH SHOP ROLL-UP DOORS	$0	$245	$245
GXXX	REPLACE TIMBER AT MAINTENANCE OF WAY	$0	$100	$100
HHXX	REPLACE HVAC LAKE MERRITT ADMINISTRATION	$0	$2,000	$2,000
HXXX	REPLACE YARD DISCONNECT SWITCH ENCLOSURES	$0	$100	$100
IIXX	REPLACE RADIANT HEATERS IN YARDS & SHOPS	$0	$40	$40
IXXX	PROCURE SWITCH POINT PROTECTORS	$0	$30	$30
JJXX	REPLACE HVAC IN YARDS & SHOPS	$0	$400	$400
JXXX	REPLACE FIR TIES ON CONCORD LINE	$0	$400	$400
KKXX	REPLACE ROOFS ON DISTRICT FACILITIES	$0	$972	$972
KXXX	REPLACE NON SERVICEABLE WHEELS & AXLES	$0	$228	$228
LLXX	REPLACE CARPET LAKE MERRITT & METROCENTER	$0	$250	$250
LXXX	ADDITIONAL REVENUE VEHICLES (145)	$0	$217,500	$217,500
MMXX	REFURBISH LANDSCAPING	$0	$1,175	$1,175
MXXX	REVENUE VEHICLE DOOR REHABILITATION	$0	$3,203	$3,203
NNXX	REPLACE NINE SIDE WINDING STATION GATES	$0	$250	$250
NXXX	COMPUTER END USER NEEDS	$0	$334	$334
OOXX	REPLACE TC2, POLICE, & YARD BASE STATIONS	$0	$150	$150
RXXX	REPLACE AUTOMATIC FILLER MACHINES	$0	$250	$250
SXXX	REPLACE SHREDDING MACHINE	$0	$60	$60
TXXX	REPLACE CASH CARTS	$0	$250	$250
UXXX	REPLACE BILL STACKERS	$0	$225	$225
VXXX	REHABILITATE FARE TICKET TRANSPORTS	$0	$2,576	$2,576
WXXX	REPLACE EMBARCADERO MODULAR ESCALATORS	$0	$500	$500
YXXX	REPLACE HYDRAULIC VALVES IN STATION ELEVATORS	$0	$210	$210
ZXXX	REPLACE MAINT. EQUIP. & SERVICE VEHICLES-1994	$0	$3,500	$3,500
99*15	SYSTEM SAFETY UPGRADE PH. III	$0	$340	$340
99*50	LAND & LAND RIGHTS	$121	$0	$121
99*51	AGENCY AND UTILITY AGREEMENTS	$1,523	$0	$1,523
99*52	OTHER COSTS (INS., BOND AGENTS, ETC.)	$1,870	$0	$1,870
99*54	OUTSTANDING CLAIMS	$3,996	$0	$3,996
99*55	PROJECT DEVELOPMENT	$28,000	$0	$28,000
99*56	PLANNING & STATION AREA DEVELOPMENT	$62,813	$0	$62,813
99*59	STATION AREA DEVELPMNT INFRASTRCTR IMPS.	$5,306	$0	$5,306
99*66	IMPROVEMENT ALLOWANCE ALLOCATION	$15,000	$0	$15,000
	GRAND TOTAL	$189,408	$256,037	$445,445

11-Jul-89

APPENDIX

CAPACITY EXPANSION

DALY CITY TURNBACK, YARD AND SHOP - FUNDED (11--,11TD)

PROJECT DESCRIPTION:

This project is to construct a turnback, yard and shop at Daly City to allow quicker train reversing south of the station and additional train/car storage. Another part of this project involves reconfiguring the M87 interlocking in the vicinity of Daly City.

PROJECT JUSTIFICATION:

Higher density train operations will require a more efficient and less time-consuming train reversing capability at Daly City. An interim measure already completed permits the reduction of the minimum scheduled headway to 3 minutes, 30 seconds through train control modifications in the vicinity of Daly City Station.

A West Bay storage facility will be needed to lay up vehicles not needed for midday operations. Layups at this yard will produce significant savings in power and vehicle maintenance costs. Shop facilities will provide essential support to the new yard and in maintaining lower headways. (The Shop Facilities project is a separate project at a cost of $7.9 million.)

As presently configured, the M-87 interlocking (which provides safe routing of trains in the vicinity of Daly City Station where the tracks cross over each other) creates interference between inbound and outbound trains. Reconfiguring the M-87 interlocking will increase operational flexibility in the vicinity of the Daly City Turnback.

ELECTRICAL CAPACITY INCREASE - FUNDED (15EG)

PROJECT DESCRIPTION:

The purpose of this project is to increase power distribution on the C-line and in all three East Bay yards.

PROJECT JUSTIFICATION:

Operation of additional peak period trains at reduced headways will require additional power distribution facilities on the C-line and in all three East Bay yards. Improvements include the installation of 2 new substations, modification and upgrade of existing yard substations, modification of the third rail and increase of yard feeder cable capacity.

WAYSIDE TRAIN CONTROL/SYSTEM PERFORMANCE MODIFICATIONS - FUNDED (20--)

PROJECT DESCRIPTION:

This project is to implement Wayside Train Control improvements and System Performance Modifications as described below.

PROJECT JUSTIFICATION:

The System Performance Study determined that a number of improvements will be necessary to achieve BART's capacity expansion objectives while maintaining or enhancing service quality. The improvements necessary include the following key tasks:

- Reconfiguration of track circuits by moving and adding blocks to minimize headways and to match Sequential Occupancy Release System (SORS) requirements
- Resignalling of some parts of the system (mostly in San Francisco)
- Improving station approaches
- Modification of SORS software to reduce the time to initialize (reset) the system and to match track modifications
- Optimization of speed codes systemwide
- Development and implementation of a delay reduction program
- Development of the simulator to include the delay model
- Modification of the Brake Rate Algorithm

YARD IMPROVEMENTS - UNFUNDED (21BB,22BB,23BB)

PROJECT DESCRIPTION:

This project is to install wiring, circuits and equipment (including car detection) to support yard control improvements at Concord, Richmond and Hayward train yards.

PROJECT JUSTIFICATION:

Some storage tracks at Concord and Hayward yards do not have operational train control capability. Installation of appropriate train control components will improve overall operational efficiency in both yards.

Modifications at the Richmond yard are required in order to optimize the operational benefits of the new C-cars.

NEW ON-BOARD ATC - FUNDED (41GB)

PROJECT DESCRIPTION:

This project will replace existing Automatic Train Control (ATC) units on all A-cars with the new units that have recently been designed for the C-cars.

PROJECT JUSTIFICATION:

The existing ATC units on A-cars represent the largest single cause of vehicle service disrupting failures on the system. The New On-Board ATC will substantially reduce ATC hardware failures and, through the use of redundancy, will reduce ATC-caused service disrupting failures by a factor of 25 to 1. These units are being installed in all new C-cars and are being retrofitted into existing A-cars.

A-CAR ELECTRONIC TRAIN DESTINATION SIGNS - FUNDED (41KD)

PROJECT DESCRIPTION:

This project is to install electronic train destination signs in all A-car cabs similar to those installed in the new C-cars.

PROJECT JUSTIFICATION:

These signs will offer general improvement over the plastic destination signs that are currently being displayed in the A-cars and will also enhance the ability to provide special information when needed. Visibility will be greater and aesthetics will also be greatly improved.

C-CARS - FUNDED (42--)

PROJECT DESCRIPTION:

The purpose of this project is to procure 150 additional revenue transit vehicles that are designed to operate in any position on a train. These new cars are designated as C-cars.

PROJECT JUSTIFICATION:

One hundred fifty new revenue vehicles are needed to service anticipated patronage growth. The new C-cars will permit expansion of existing trains to the maximum length of 10 cars long, addition of new trains on the system (after headways are reduced), and efficient on-line sizing of trains. These cars can be placed at the head of a train (like an A-car) or in the middle of a train (like a B-car).

INTEGRATED CONTROL SYSTEM - FUNDED (61--)

PROJECT DESCRIPTION:

The Integrated Control System (ICS) project will implement a new central train computer, in conjunction with various supporting wayside equipment, to provide capability of operating above the current 55 train limit.

PROJECT JUSTIFICATION:

The central train computer, in conjunction with various supporting wayside equipment, provides systemwide train supervision and control. The existing central computer is capable of monitoring and controlling the movement of up to 55 trains at any one time. Expansion of the central control capabilities is needed to allow for on-line train operations exceeding the current 55 train limit, and have the capability to incorporate extensions into the BART system. ICS will allow BART to operate 75 on-line trains initially, with the capability of expanding the control system for operating 115 trains.

CONSIST DATA-MARIS/ICS EXCHANGE - FUNDED (65DB)

PROJECT DESCRIPTION:

This software development project will allow the Management Information System (MIS) computer to exchange data with the Integrated Control System (ICS) computer.

PROJECT JUSTIFICATION:

The purpose of this project is to provide:

- the Integrated Control System (ICS) with corrected consist data so that train operations controllers can make mainline consist size changes.
- more timely, accurate, complete and consistent consist data for train operations users.
- continuing support for the COMSPEC and Train Delay Monitor application systems on the Management Information System computer complex.
- the Maintenance and Reliability Information System (MARIS) with consist data, and facilitate the return of consist data corrections to ICS.
- for keeping required efforts within reasonable bounds for affected personnel.

ADDITIONAL TRACK INSTALLATION - UNFUNDED (OXXX)

PROJECT DESCRIPTION:

Purchase of land for and installation of additional track at Oakland Shop.

PROJECT JUSTIFICATION:

Additional track is required to store high-rail maintenance vehicles at Oakland Shops. Project requires land acquisition from Union Pacific.

CONSTRUCT OVERPASSES - UNFUNDED (PXXX)

PROJECT DESCRIPTION:

Design and Construct Train Operator Overpasses.

PROJECT JUSTIFICATION:

Once end-of-line makes and breaks become operational, yard stops on tracks one and two on the C and A Lines will be necessary to move T/O's between the yards and end-of-line.

CASH BUILDING EXPANSION - UNFUNDED (QXXX)

PROJECT DESCRIPTION:

Construct expansion of the Cash Building to provide for projected cash handling increase and employee facilities.

PROJECT JUSTIFICATION:

Expansion is required to provide more operating room, expanded restroom facilities (25 women share 2 stalls) and expanded locker rooms.

C-CAR START-UP - FUNDED (99*73)

PROJECT DESCRIPTION:

This project includes training and other miscellaneous costs associated with placing the new C-cars in service.

PROJECT JUSTIFICATION:

A number of activities of an administrative and training nature are anticipated to be required prior to placing all C-cars in service. This project covers all or part of those costs.

SYSTEM PERFORMANCE STUDY JUSTIFIED PROJECTS - FUNDED (99*75)

PROJECT DESCRIPTION:

This project covers miscellaneous modifications to the train control system to bring the system up to the full potential identified as possibly achievable in the System Performance Study.

PROJECT JUSTIFICATION:

When BART was seeking funding of the System Performance Study modifications (Wayside Train Control SPS Justified Mods), UMTA expressed reluctance to fund a part of the work called "Delay Reduction". BART subsequently agreed with the TOCC to fund these tasks from BART sources. This project covers these costs.

SYSTEM PERFORMANCE STUDY JUSTIFIED PROJECTS - PH II - FUNDED (99*81)

PROJECT DESCRIPTION:

This project is the final stage of miscellaneous modifications to the new train control system.

PROJECT JUSTIFICATION:

Minor refinements to support operational requirements will be required once the new train control system is implemented.

DALY CITY COMPLETION CONTINGENCY - FUNDED (99*84)

PROJECT DESCRIPTION:

This project covers costs associated with property acquisition not covered by the UMTA Full Funding Grant Agreement.

PROJECT JUSTIFICATION:

The final cost for acquisition of the Pak 'N Save property was determined after the Full Funding Grant Agreement was signed.

BASIC SYSTEM

DISTRICT ROOF REPLACEMENT - PARTIALLY FUNDED (01--)

PROJECT DESCRIPTION:

The purpose of this project is to replace roofing on various facilities throughout the District.

PROJECT JUSTIFICATION:

Approximately fifty percent of District facilities have leaking roofs due to age. This project prioritizes and phases the work over a five-year period based on the severity of the leakage.

TRAIN OPERATOR BREAK ROOM MODIFICATIONS - FUNDED (01RM,03PH,05NF)

PROJECT DESCRIPTION:

This project will provide additional locker, restroom, and break room facilities at three East Bay Yards.

PROJECT JUSTIFICATION:

All three BART train yards have a transportation building for train operators, transportation supervisors and clerical support staff. This facility provides a combination kitchen/lunchroom with space for vending machines, and table and chairs, separate restrooms and locker rooms for male and female train operators, and office space for administrative personnel. These transportation buildings provide a place for train operators to prepare for shift check in and out, where lunches and breaks are taken and where a variety of administrative matters are handled.

When the BART system was built, there was an estimate made of required capacity for break rooms. It was based on train run times and the expected number of operators required to operate trains. The original estimate has proven wrong due to several factors. For example, the travel time (from one end of a line to another) has increased since the original design. Work rules require a break between runs which was not originally envisioned. Another example is that the number of train operators required for yard operations is more than originally planned.

Consequently, it takes more train operators to run current service than was originally planned. Thus, the train operator break rooms are marginally sufficient for even current operations and need to be expanded for planned service increases.

There are approximately 258 train operators at BART. When peak revenue service expands, approximately 30 additional train operators will be required. The transportation facilities are overcrowded with some lockers housed in restrooms. With the addition of 30 train operators, the situation will worsen. Additionally, separate restroom facilities for men and women are required.

This project rehabilitates and expands current transportation buildings for maintaining existing levels of service by providing for adequate restroom and locker capacity for train operators who operate the trains.

CONSOLIDATE COMPONENT REPAIR SHOP - FUNDED (01SO)

PROJECT DESCRIPTION:

With the completion of the new storeroom at Hayward Shop, the old storeroom area has become available. This area is adjacent to the major component repair activities at the Hayward Shop and provides a means to consolidate all remote component repair activities and accommodate the additional work space required to support the new equipment on the C-car.

PROJECT JUSTIFICATION:

Consolidation will improve efficiency and support C-car activities and provide the necessary space to incorporate repair facilities for new equipment such as inverters, air conditioning units, etc.

WOMEN'S RESTROOM/LOCKERS & SHOWER - OHY - FUNDED (01SR)

PROJECT DESCRIPTION:

An existing men's restroom will be expanded and converted into a women's restroom with adequate shower facilities and locker space.

PROJECT JUSTIFICATION:

This project is required to accommodate the increased number of females working on the Hayward Shop floor. In the last eight years, the number of females employed in the shop has gone from five (5) to fourteen (14). There is only one women's restroom in the shop area, as compared to three men's restrooms and locker and shower facilities.

REBUILD PAVEMENT AT FREMONT & UNION CITY - UNFUNDED (01VL, 01XL)

PROJECT DESCRIPTION:

The Fremont and Union City pavement overlays will be redesigned and reconstructed to significantly improve their strength in order to handle heavier loads.

PROJECT JUSTIFICATION:

Bus and heavy traffic loads have caused the existing pavement to break up. Delays in repairing the pavement will result in further deterioration of the sub-base and increased cost to rebuild the composites. There is a potential for liability claims resulting from the deteriorated pavement.

34.5KV SUBTRANSMISSION LINE MODS-CLN - FUNDED (03CH)

PROJECT DESCRIPTION:

Modifications to the 34.5KV sub-transmission traction power line between Orinda and Concord include (1) Insulating the PILC cable potheads, (2) Installing surge supressors for the cables, (3) Removing plants that interfere with underground cables, (4) Providing new supports for cable splices in aerial boxes, and (5) Removing aerial conduit slip joints and resupporting the cable.

PROJECT JUSTIFICATION:

There have been numerous 34.5KV PILC cable failures which have required about 50 repair splices. These recent failures constitute an excessive failure rate, with such failures possibly impacting revenue service. The modifications described above will improve the failure rate, making the cables more reliable and maintainable.

WET STANDPIPE SYSTEM/SOUTH BORE-BHT - FUNDED (03FM)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install a Wet Standpipe system in the Berkeley Hills Tunnel (BHT) with outlets every 300 feet.

PROJECT JUSTIFICATION:

Fire services have no facilities available in the south bore of the BHT. This project is recommended by staff as an alternate to Gage Babcock Associates's recommendation (#18) of installing a second main in the south bore of the BHT and has been concurred with by the CPUC and it's consultants.

PATRON EXITING MODIFICATIONS - CONCORD STATION - PARTIALLY FUNDED (03RB)

PROJECT DESCRIPTION:

This project is to add an additional stairway at Concord Station to accommodate increases in patronage.

PROJECT JUSTIFICATION:

This project is to add one platform stairway at Concord Station in order to improve station platform access and egress. Two factors contribute to this access deficiency. First, BART will implement closer headways on all lines resulting from the Capacity Expansion program which means that passengers will offboard in stations at more frequent intervals. Thus, the project continues system improvements to provide increased capacity. Second, business development in the Concord Station area is creating a reverse commute which will require improved station access for the reverse flow of patrons.

It is therefore in the best interest of the patron that an additional stairway be constructed. During peak periods, the additional stairway will better accommodate the reverse passenger flow and minimize disruption of normal patron exiting.

RENOVATE LOST & FOUND FACILITY - FUNDED (07DB)

PROJECT DESCRIPTION:

This project will create an enclosed room (which can be accessed from the paid and free areas) at Twelfth Street Station for processing lost and found items.

PROJECT JUSTIFICATION:

This project will bring the current makeshift lost and found facility up to current county safety code standards.

2 STAIRWAYS-PLATFORM/CONCOURSE-WOS - FUNDED (11DB)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install two additional stairways, one for each of two platforms, from the platform level to the concourse level at West Oakland station.

PROJECT JUSTIFICATION:

The emergency exiting time from the West Oakland platforms is currently 7.65 minutes, which exceeds the 6.0 minute limit agreed to by BART, the CPUC and the Fire Liaison Committee (FLC). Adding the additional stairways will bring the platform exiting times within the agreed upon time limits.

2 END STAIRWAYS-PLATFORM/CONCOURSE-EMS - FUNDED (11FG)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install two additional stairways, one at each end of the station, from the station platform to the concourse at Embarcadero Station.

PROJECT JUSTIFICATION:

The emergency exiting time from the platform exceeds the 6.0 minute limit agreed to by BART, the CPUC and the FLC. Adding the additional stairways will bring the platform exiting times within the agreed upon time limits.

RPLACE LINE-SECTION SUMP PUMPS-PPS - FUNDED (11HE)

PROJECT DESCRIPTION:

The two pumps at the Powell Street pumping station will be replaced. These pumps are mounted in a 16 ft. deep sump and are difficult to access for maintenance. The pumps will also be redesigned for easier access.

PROJECT JUSTIFICATION:

One of the two pumps at the Powell Street pumping station has failed and is beyond repair. The second pump is noisy and is expected to fail in the near future. Since these pumps have no direct replacement, it is necessary to re-specify the pumps, which will allow for easy access as maintenance is required.

The pumps handle the inflow of ground water. If the pumps fail the tunnels could become flooded, thereby impacting revenue service.

WET STANDPIPES-STATIONS & SUBWAYS - FUNDED (15AZ)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to provide eleven (11) at grade stations with fire department connections and extend the station wet standpipe systems in twenty (20) above grade stations. Below grade, eight (8) failed dry standpipes will be replaced with new wet standpipes spaced 300 to 370 feet apart. Additionally, 60 cabinets will be installed in the stations for storage of fire hose at the connection points of the undercar sprinkler system.

PROJECT JUSTIFICATION:

The project will implement Gage Babcock Associates' recommendations Nos. 10 and 11 at stations that are not below grade. In subways, the failed dry standpipes must be replaced. Replacement with wet standpipes will satisfy part of Gage Babcock Associates' recommendation No. 13, at least for the 8 subway locations in question. The hose cabinets are an alternative to Gage Babcock Associates' recommendation of directly connecting the undercar sprinklers, and has been concurred with by the CPUC and their consultant.

PIGEON CONTROL - FUNDED (15BG)

PROJECT DESCRIPTION:

This project provides for installation of pigeon netting and fencing at eight stations to eliminate pigeon roosting.

PROJECT JUSTIFICATION:

Installation of pigeon netting and fencing will help protect passengers from pigeon droppings and keep stations clean.

DRY STANDPIPES(56) - SUBWAYS - FUNDED (15BH)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and will replace the remaining 56 dry standpipes in the underground. These standpipes will have outlets every 300 feet and water flow of 500 GPM at 100 PSIG. This project is in addition to the wet standpipes being replaced under project 15AZ.

PROJECT JUSTIFICATION:

The project will complete the implementation Gage Babcock Associates' recommendation No. 13 ("Provide all underground line sections with wet standpipe systems...") which has been vigorously supported by the fire departments and has the endorsement of the CPUC, their consultant, and BART.

RAIL REPLACEMENT - FUNDED (15CN)

PROJECT DESCRIPTION:

This project is part of an ongoing program to replace rail as it reaches the end of its life expectancy.

PROJECT JUSTIFICATION:

Due to BART trains traveling up to speeds of 80 mph, with an acceleration rate of 4.4 feet per second squared operating under a fully automated train control system, it is most important that the track structure be maintained at a level that meets Federal Railway Administration and other transit systems safety standards.

ESCALATOR REHABILITATION PROGRAM - FUNDED (15LC&)

PROJECT DESCRIPTION:

This project will provide for the rehabilitation of station escalators throughout the system.

PROJECT JUSTIFICATION:

District escalators have been operating approximately 20 hours per day for the last 10 to 12 years. Based on the increased shutdown for repairs, it is believed that District escalators are reaching their optimum life expectancy and require this major rehabilitation.

STATION ENTRANCE CANOPYS - PARTIALLY FUNDED (15RB)

PROJECT DESCRIPTION:

The purpose of this project is to cover all exposed escalator and stairway entrances to subway stations.

PROJECT JUSTIFICATION:

BART presently has 43 escalators exposed to the elements. These units are located at 36 entrances of eight stations in Oakland and San Francisco. These units have significantly higher failure rates, take longer to repair and have a shorter life span than protected units. In addition, because they are exposed, they are more hazardous to patrons during inclement weather. Installation of covers over these exposed units would increase the reliability of these units and extend their useful life. There are 14 subway entrances, with stairs only, at downtown Berkeley, Oakland and San Francisco that are open to the weather. Enclosure of these entrances would improve station cleanliness and appearance and enhance security for patrons and employees.

UNDERGROUND STORAGE TANK MONITORS - FUNDED (15SA)

PROJECT DESCRIPTION:

This project is necessary to bring the District into compliance with California State Law revisions which require tanks containing hazardous materials to be monitored for leaks.

PROJECT JUSTIFICATION:

The District owns 22 underground tanks, 13 of which have been exempted from the new regulations. Of the nine remaining tanks, one waste oil tank at Richmond Yard will be removed completely. Three tanks, one each at Richmond, Concord and Hayward yards, will be replaced with double-walled tanks with monitoring systems. In addition, a monitoring system will be installed for an existing diesel tank at the MetroCenter. The four remaining tanks are handled in a separate project discussed below.

REPLACE UNDERGROUND FUEL TANKS - FUNDED (17DC)

PROJECT DESCRIPTION:

This project is to replace four underground fuel storage tanks located at Oakland Shops.

PROJECT JUSTIFICATION:

This project will bring fuel tank storage operations up to California State Administrative code requirements. Four tanks will be replaced with new double-walled tanks and tank monitoring devices.

ELIMINATE STATION INTERFACES - FUNDED (20AC)

PROJECT DESCRIPTION:

This project will provide the necessary interstation cables and complete the other required modifications to the train control equipment to eliminate the headway constraints at 11 locations.

PROJECT JUSTIFICATION:

This modification will allow continuous "following move speed profiles" across the interface, thus reducing the minimum headways between trains at critical locations. The present train control system does not have sufficient numbers of vital interstation cables necessary to pass the individual track circuit occupancies.

STATION BACKUP POWER - FUNDED (20HB)

PROJECT DESCRIPTION:

This project is intended to purchase and install equipment and batteries to upgrade the essential power systems in train control rooms.

PROJECT JUSTIFICATION:

Certain BART train control and communications equipment is supplied by essential power systems. These systems provide uninterruptible power during station power outages and isolate the supplied equipment from utility power system transient disturbances. Currently, uninterruptible power systems (UPS) furnish this essential power.

The original installations are now loaded to a point that certain critical equipment is not supplied by uninterruptible power systems. Some functions which are presently supplied by essential power will be replaced by new projects, but total demand will continue to be greater than the existing essential power capacity. Providing additional essential power would improve availability of voice and data communications between central control and field locations during periods of loss of power from the local utility.

The scope of this project is to provide for design, furnishing, and installation of equipment and batteries to upgrade the essential power systems in the train control rooms of 31 stations (three stations have been handled by earlier contracts), three yards, three ventilation structures and one portal structure for new and existing systems.

Upon completion of this project, existing essential power supply equipment would be replaced at all 38 locations with new static-type uninterruptible power supply equipment similar to the existing equipment, but of a larger capacity. Existing battery capacities at all locations would be sized to one and one-half hour capacity.

YARD EFFICIENCY MODIFICATIONS - FUNDED (21EB&)

PROJECT DESCRIPTION:

This project will complete installation of Automatic Car Identification (ACI) system in the Concord, Richmond, and Hayward yards.

PROJECT JUSTIFICATION:

The ACI scanning systems and associated hardware/software at BART identify and automatically record the location of individual BART cars throughout the BART system. This project pertains to the incomplete yard portions of the scanning systems.

Subsequent to the installation of the original ACI systems, BART extended some storage tracks and added others in the three storage yards. Cars entering or stored in these added areas are "lost" to the scanning system and consequently not automatically recorded. The current procedure requires otherwise busy personnel to manually track and record the location of cars on the added or extended tracks. This project will permit the installation of additional ACI systems in the yard areas where needed.

Manual input of car locations can lead to errors during busy times such as morning and evening layups; afternoon buildups; replacement of bad order trains; and repaired cars that are moved from the revenue vehicle shop area to storage tracks. Such manual procedures can interfere with mainline operations by distracting tower operators. Errors have allowed bad-order cars to be dispatched. Then the train must be removed causing a missed dispatch and sometimes an off-load.

RADCOM MODIFICATIONS - CENTRAL CONTROL - FUNDED (270C)

PROJECT DESCRIPTION:

The purpose of this project is to install upgraded electronic equipment in Central Control.

PROJECT JUSTIFICATION:

This project provides for the replacement of obsolete electronic equipment in Central Control such as computer consoles; and also includes replacement of the flooring. Installation of upgraded equipment will enhance the ability of Central operations and maintenance personnel to perform their duties.

INSTALL SIXTH CAPACITOR & MODIFY OLR - FUNDED (41BU)

PROJECT DESCRIPTION:

This project adds a sixth capacitor to the propulsion system and changes the response time of the traction motor overload relay (OLR) in order to reduce the number of traction motor overloads.

PROJECT JUSTIFICATION:

The transit vehicle propulsion system continues to have a high number of overload failures which result in flashed traction motors, failed T-1 thyristors, blown main fuses and blown shoe fuses (with resultant motor alternator failures). These failures can disrupt mainline operation when smoke is generated from the overload, impact the shop work load and stress other propulsion system equipment.

COUPLER PINS & SOLENOID VALVES - FUNDED (41EM)

PROJECT DESCRIPTION:

This project will replace the couple yoke pin and the uncoupling solenoid valve on all A and B cars.

PROJECT JUSTIFICATION:

This modification will prevent unanticipated car uncouplings which have occurred in the past.

BATTERY OVER-TEMPERATURE SENSOR - FUNDED (41JJ)

PROJECT DESCRIPTION:

There are 350 revenue vehicles which require the installation of a battery overtemperature circuit. The circuit includes a temperature sensor in the battery compartment and circuitry which automatically shuts down the battery charger when an overtemperature condition occurs.

PROJECT JUSTIFICATION:

In the last several years there have been four cars which have had battery fires. The repair cost is approximately $50,000 per car per occurrence. The Battery Overtemperature Sensor installation will pay for itself by preventing future battery fires.

To date this has not been considered a safety problem because it only occurs on cars stored in the yard with auxiliaries running. However, it could become a problem if cars are stored in tunnels with auxiliaries operating. Tunnel storage may be required in order to satisfy future operating requirements.

REGIONAL MULTI-OPERATOR PASS - PARTIALLY FUNDED (44--)

PROJECT DESCRIPTION:

The purpose of this project is to develop on-board validator hardware and software for installation on Central Contra Costa Transit Authority (CCCTA) and BART Express buses. In addition, credit/debit machines will be installed at stations serving CCCTA and BART Express buses.

PROJECT JUSTIFICATION:

This demonstration project will develop the hardware and software required to provide total, regional multi-modal transfers with just one ticket. The initial phase encompasses development and installation of on-board validators on one hundred eleven Central Contra Costa Transit Authority (CCCTA) buses, which serve five BART stations and on BART Express bus routes which serve five stations. The stored value equipment will provide for transfers among operators, with the capability to provide for operator discounts at multiple levels. The on-board equipment will act like a BART gate, subtracting fare from a stored value ticket, with the amount depending on whether a connecting BART trip is being made. As more operators are added (Phases II and III), the equipment will keep track where tickets are used to facilitate revenue sharing among operators. In addition, debit/credit machines will be installed, as well as modifications made to the existing BART faregates in order to accommodate this new equipment.

MULTI-DENOMINATIONAL BILL VALIDATORS - FUNDED (45AN)

PROJECT DESCRIPTION:

The "Multi-Denomination Bill Validators" project is intended to replace the $1 and $5 validators presently installed in IBM ticket vendors with units that will accept $1, $5, $10 and $20 denominations.

PROJECT JUSTIFICATION:

Reduction in bill handling will reduce maintenance and operating costs. Patron complaints of not being able to use higher denomination bills will be eliminated.

IBM TICKET TRANSPORT RETROFIT - FUNDED (45BF)

PROJECT DESCRIPTION:

This project is to retrofit ticket vending machines, addfare machines and fare gates with updated components.

PROJECT JUSTIFICATION:

IBM fare machines in some locations have been operating continually for over 15 years. Examination of the ticket handling mechanism (THM) of two fare gates and one ticket vendor reveals that 60-90% of the moving components are sufficiently defective to require replacement with updated components.

9 VENDORS AND 8 ADDFARES - UNFUNDED (47BA)

PROJECT DESCRIPTION:

The purpose of this project is to procure nine (9) ticket vendors and eight (8) addfare machines to be installed at various BART stations.

PROJECT JUSTIFICATION:

Based on a comparison of a simulation model and systemwide performance criteria, AFC deficiencies were identified. Primarily, these deficiencies are unacceptable levels of patron queuing at exit faregates, ticket vendors and addfares. To overcome these deficiencies, it was determined that seven vendors and seven addfares would have to be procured. In addition, faregates now in storage would be modified to current baseline configuration and installed.

The benefit of this project is improved convenience to passengers during the peak period. This project is required to maximize the benefits of BART's Capacity Expansion program. The Capacity Expansion program is nearly funded and represents a major commitment of federal, state, local and BART funds. Without smaller projects such as this one, BART is put in the position of providing greater capacity for service in a manner that is inefficient and inconvenient for passengers.

This project includes the installation of 2 vendors and one addfare at Daly City Station to support the Daly City Intermodal project.

STATION TRAIN APPROACH MONITORS - FUNDED (59CN)

PROJECT DESCRIPTION:

This is a demonstration project to determine if a graphic display of train movement is obtainable from the train control computers and if such information is useful to patrons. The eventual goal is to have train display monitors in the paid areas and free areas to provide patrons with exact train location information.

PROJECT JUSTIFICATION:

The demonstration project is designed to provide passengers and employees (Station Agents) with current information relative to exact train locations. The intent is to improve communications so that patrons know when to be at the platform and when there is a system delay. A/C Transit Supervisors will be able to determine how long buses should be held at a station to wait for an approaching train.

PB&R INFO PROCESS NETWORK-EUC - UNFUNDED (65ED)

PROJECT DESCRIPTION:

This project will provide for additional computers in the Planning, Budget and Research (PB&R) department which will be linked together over a network for information sharing purposes.

PROJECT JUSTIFICATION:

The additional computers and computer network will enable the PB&R department to support BART's extension projects without major staff increases. This additional support is gained through increased productivity.

E&C PROJ MGT NETWORK SYST-PH.2 - UNFUNDED (65HC)

PROJECT DESCRIPTION:

The project provides for a tailored PC-based cost/schedule control system that is linked to the District's mainframe-based Financial Management System. The project will provide an integrated scheduling and cost control system at the project management level. This part of the project is Phase II of a four phase project which is described below.

PROJECT JUSTIFICATION:

The project consists of four phases:

- Phase I, which is essentially complete, provides for the initial data base design and link to BART's mainframe system

- Phase II, which is this project, prototypes the network design, then implements the network with five departments participating.
- Phase III provides for PC/networking implementation for the Extensions Department Facility and direct networking to E&C for shared use of the Project Management/Tracking Program data base.

- Phase IV has been identified as total PC networking for Maintenance and Engineering departments.

The project is required to provide electronic integrated scheduling, cost control, reporting and project management system tools, at the project management level. Completion of this project meets UMTA requirements for Project Control, electronic Critical Path Management (CPM) scheduling, and reporting of Federally funded projects. Capital Programs will use the Project Management data as input to UMTA's Grant Management Information System (GMIS) network.

COMMUNICATIONS & COMPONENT REPAIR AFC RELIABILITY REPORTING - FUNDED (65NB)

PROJECT DESCRIPTION:

This project involves installing input terminals in station agent booths to transmit automatic fare collection (AFC) failure incidents and repairs to a mini computer located at the Lake Merritt reporting location. The project includes project development, testing and implementation.

PROJECT JUSTIFICATION:

The problems in AFC incident reporting arise from the failure of the current telephone taping system to provide an accurate and timely on-line status report. These problems include technical problems with the tape recorders and telephone lines between Hayward Shop and the stations; unreported incidents and repairs; and incorrect or unclear information on the tapes.

REPLACE CHILDERS COIN SORTERS - FUNDED (68CD)

PROJECT DESCRIPTION:

The purpose of this project is to replace two coin sorter machines with new equipment.

PROJECT JUSTIFICATION:

The performance of the machines over the last four years has continued to degrade, and maintenance has become increasingly difficult due to lack of spare parts. Spare parts must be custom made since these are not production machines. Replacement of parts is costly and contributes to extended down time. In recent months, down time has increased and several problems have arisen which affect fare collection maintenance and cash counting operations. This equipment purchase will reduce machine down time, and reduce costs through reduced maintenance and cost of parts.

FOUR TRACTOR/TRAILER ARMORED TRUCKS - FUNDED (68DE)

PROJECT DESCRIPTION:

The purpose of this project is to replace four armored trucks with armored tractor-trailer trucks.

PROJECT JUSTIFICATION:

Four armored vehicles are currently used for handling and transporting cash. The current fleet of trucks is overage and overdue for retirement. In addition, the present fleet will be unable to handle the increased demands for handling and transporting cash as a result of the Capacity Expansion Program.

REPLACE MAINTENANCE/SERVICE VEHICLES & EQUIPMENT-PARTIALLY FUNDED (79A1 & 79A2)

PROJECT DESCRIPTION:

This project is to procure replacement maintenance/service vehicles and equipment.

PROJECT JUSTIFICATION:

Properly operating maintenance/service vehicles and equipment assist BART in providing safe, comfortable, reliable and efficient service.

BART's maintenance equipment gradually becomes worn from age and usage. Eventually it becomes more economical to replace the old equipment rather than repair it. The ongoing equipment replacement program assures that old, wornout equipment is replaced in a timely manner to minimize overall costs and ensure personnel safety. If this equipment is not replaced, overall costs will increase and maintenance crews will be disrupted by failed equipment.

This maintenance equipment includes such items as electric and pneumatic grinders and hand tools, portable light and power generator sets, light towers, air compressors, electric carts for transporting personnel and material, commercial lawnmowers, ground maintenance equipment, vacuums, floor scrubbers, polishers and various floor maintenance equipment; shop equipment such as jacks, jack stands, saws, drills, engine test equipment, electric and electronic meters, gauges, test instruments and equipment.

BART has a fleet of light-duty highway vehicles to transport personnel and necessary equipment to work sites in the District. In addition, BART police and District personnel use sedans for regular duties. These vehicles are selected for replacement according to a consistent procedure developed by BART staff. Generally, the policy requires that sedans and pickups must be replaced after 70,000 miles and vans and police cars after 90,000 miles. At current usage rates, an average of 40 light-duty vehicles must be replaced each year. On the average, this is equivalent to replacing each vehicle every five years.

However, heavily used vehicles are replaced more often while lightly used vehicles are replaced less often.

Heavy-duty maintenance vehicles also need periodic replacement. Maintenance personnel use these vehicles, which include diesel trucks, tractors, and track-maintenance vehicles, to repair and maintain BART's physical plant and to respond to emergencies. These vehicles' costs and useful lives vary widely.

Annual replacement needs and costs vary accordingly. The ongoing vehicle replacement program assures that all support vehicles are replaced in a cost-effective manner. Without this program, continued use of overage vehicles would increase maintenance and other costs, as well as safety-hazards to personnel.

REPLACE HIGHWAY VEHICLES - FUNDED (79B-)

PROJECT DESCRIPTION:

The purpose of this project is to procure various maintenance vehicles, administrative sedans and police vehicles.

PROJECT JUSTIFICATION:

Due to limited funding for replacement vehicles, BART currently has over twenty vehicles that exceed the District criteria for replacement. To continue operating these vehicles will result in increased maintenance due to major repairs that are required.

MEGAPHONES FOR T/O'S - FUNDED (79KB)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is for the purchase of megaphones for use by Train Operators.

PROJECT JUSTIFICATION:

The project will satisfy a Gage Babcock Associates' recommendation that is supported by the fire departments and the CPUC. Megaphones are believed to enhance the communication ability of the Train Operators during emergency evacuations.

RAIL GRINDER - FUNDED (79MP)

PROJECT DESCRIPTION:

This project provides for the acquisition of one rail grinder.

PROJECT JUSTIFICATION:

The replacement rail grinder will retire the present, nearly worn out vehicle and also provide added rail grinding capability to support train service expansion. Rail grinding is a very important facet of the maintenance program as it ensures lessening wheel impact on the revenue car due to rail corrugation as well as providing patrons with a smooth, quiet ride.

INVENTORY BUILDUP - FUNDED (93DP)

PROJECT DESCRIPTION:

This project is to purchase inventory which is needed to sustain revenue service.

PROJECT JUSTIFICATION:

This work is necessary for continued adequate on-hand inventory.

LEGAL & ADMINISTRATIVE SERVICES - GENERAL - FUNDED (98AA)

PROJECT DESCRIPTION:

This project provides funding for a contract employee to coordinate the Universal Ticket Program.

PROJECT JUSTIFICATION:

The Universal Ticket Project will require close coordination and resolution of several critical issues including revenue sharing and distribution, selection of a service bureau, and establishment of inter-operator transfer policies. Because these services cannot be satisfactorily performed by existing BART staff, a consultant will be hired to perform the work.

REPLACE ELECTRIC CARTS - UNFUNDED (AAXX)

PROJECT DESCRIPTION:

This project replaces 15 electric carts in yards.

PROJECT JUSTIFICATION:

These carts are 10 years old and are failing. These carts are used to transport operations and maintenance personnel around the yards and shop areas.

STATION FIRE ALARM SYSTEMS - UNFUNDED (AXXX)

PROJECT DESCRIPTION:

This project is a safety-related project which includes replacement of station fire alarms.

PROJECT JUSTIFICATION:

Existing alarms at 32 stations are obsolete, parts are no longer manufactured and the alarms have a high failure rate.

REPLACE ELECTRIC CART BATTERY CHARGERS - UNFUNDED (BBXX)

PROJECT DESCRIPTION:

This project is to replace cart battery chargers in yards.

PROJECT JUSTIFICATION:

Battery chargers are used to charge electric cart batteries and are needed in concurrence with the electric cart replacement project.

ADDITIONAL POLICE RADIO CHANNEL - UNFUNDED (BXXX)

PROJECT DESCRIPTION:

This project is to add an additional police radio channel to supplement the existing channel.

PROJECT JUSTIFICATION:

BART Police Services requires a second police radio channel to relieve the primary channel of radio traffic in the event of an emergency.

REPLACE REVENUE VEHICLE WHEEL PRESS - UNFUNDED (CCXX)

PROJECT DESCRIPTION:

This project is to replace the revenue vehicle wheel press.

PROJECT JUSTIFICATION:

The existing wheel press was purchased 15 years ago (used) and is now 40-50 years old. Parts are hard to find because the press is obsolete. It is frequently down for repairs.

RAIL REPLACEMENT - 1994 - UNFUNDED (CXXX)

PROJECT DESCRIPTION:

The replacement of worn rail throughout the system is an ongoing project.

PROJECT JUSTIFICATION:

Replacement of rail is required every 5-7 years.

REPLACE LINE PUMPS - UNFUNDED (DDXX)

PROJECT DESCRIPTION:

This project replaces/refurbishes line pumps systemwide.

PROJECT JUSTIFICATION:

The existing pumps are 20 years old and ready for replacement. These pumps are required to pump out water from underground trackways to prevent flooding.

REPLACE RAIL LUBRICATORS - UNFUNDED (DXXX)

PROJECT DESCRIPTION:

This project is to replace the rail lubricators systemwide.

PROJECT JUSTIFICATION:

These components are nearly 20 years old, have never been replaced, and are failing with increased frequency. A failure increases friction between the rails and the wheels.

REPLACE SEWAGE PUMPS - UNFUNDED (EEXX)

PROJECT DESCRIPTION:

This project is to replace/refurbish sewage pumps.

PROJECT JUSTIFICATION:

The existing pumps are 20 years old and ready for replacement. These pumps are required to pump out sewage from underground stations to prevent sewage backing up into the station platform areas.

REPLACE INSULATED JOINTS - UNFUNDED (EXXX)

PROJECT DESCRIPTION:

This project provides for the replacement of trackway insulated joints systemwide.

PROJECT JUSTIFICATION:

These components are nearly 20 years old, have never been replaced, and are failing with increased frequency. A failure causes a false occupancy.

REPLACE LIGHTING FIXTURES-TRANSBAY TUBE - UNFUNDED (FFXX)

PROJECT DESCRIPTION:

This project replaces lighting fixtures in the Transbay Tube lower gallery.

PROJECT JUSTIFICATION:

Replacement of the existing fixtures is required because there are no longer replacement lenses for the fixtures currently installed. The old lenses would be salvaged for use in other subways.

REPLACE DIRECT FIXATION RAIL FASTENERS - UNFUNDED (FXXX)

PROJECT DESCRIPTION:

This project provides for the replacement of existing Direct fixation rail fasteners at curves in the rail structure.

PROJECT JUSTIFICATION:

These components are nearly 20 years old, have never been replaced, and are failing with increased frequency. These fasteners are used in places where the rail curves.

REPLACE SHOP ROLL-UP DOORS - UNFUNDED (GGXX)

PROJECT DESCRIPTION:

This project replaces/refurbishes the shop roll-up doors.

PROJECT JUSTIFICATION:

The doors require replacement at all three yards because the doors are obsolete and parts are no longer available. The doors malfunction frequently and must be removed for repair.

REPLACE TIMBER AT MAINTENANCE OF WAY ACCESS POINTS - UNFUNDED (GXXX)

PROJECT DESCRIPTION:

This project replaces old timber in maintenance of way access points.

PROJECT JUSTIFICATION:

The trackbeds at maintenance of way access points are made of wood and have deteriorated due to continuous exposure to the elements over the past 20 years. Replacement insures continuing maintenance of the system infrastructure.

REPLACE HVAC AT LAKE MERRITT - UNFUNDED (HHXX)

PROJECT DESCRIPTION:

This project replaces heating, ventilation and air conditioning (HVAC) system at Lake Merritt Station Administration Building.

PROJECT JUSTIFICATION:

The existing LMA HVAC system is ineffective and highly energy inefficient and requires manual manipulation. The new system would be automatic and would save BART $125K/year in energy costs.

YARD DISCONNECT SWITCH ENCLOSURES - UNFUNDED (HXXX)

PROJECT DESCRIPTION:

This project provides for the replacement of all yard disconnect switch enclosures throughout the system.

PROJECT JUSTIFICATION:

These components are nearly 20 years old, have never been replaced, and are failing with increased frequency. These switches isolate storage tracks and spur tracks.

REPLACE HEATERS IN YARDS AND SHOPS - UNFUNDED (IIXX)

PROJECT DESCRIPTION:

This project replaces radiant heaters in yards and shops.

PROJECT JUSTIFICATION:

The radiant heaters in the shops are old and replacement parts are no longer available.

PROCURE SWITCH POINT PROTECTORS - UNFUNDED (IXXX)

PROJECT DESCRIPTION:

This project provides for the procurement and installation of switch point protectors.

PROJECT JUSTIFICATION:

This initial installment of this component is an enhancement designed to protect the switches in the yards from getting hit and being damaged by the wheels of revenue vehicles.

REPLACE HVAC-YARDS AND SHOPS - UNFUNDED (JJXX)

PROJECT DESCRIPTION:

This project replaces heating, ventilation and air conditioning (HVAC) in Yards and Shops.

PROJECT JUSTIFICATION:

The current systems are not energy efficient and are extremely expensive to maintain and operate. A new automatic system would pay for itself in efficient energy usage within a short period.

REPLACE FIR TIES ON CONCORD LINE - UNFUNDED (JXXX)

PROJECT DESCRIPTION:

This project replaces wooden fir ties with concrete ties on the C-Line.

PROJECT JUSTIFICATION:

This project is to hire a contractor to replace wooden ties with concrete ties on the C-Line. The concrete ties have already been procured.

DISTRICT ROOF REPLACEMENT - UNFUNDED (KKXX)

PROJECT DESCRIPTION:

This project replaces roofs on District Facilities.

PROJECT JUSTIFICATION:

Part of this project has been previously approved by PRB and is funded with BART reserves. This phase of the project would cover the remaining 12 leaking roofs in the District.

REPLACE NON-SERVICEABLE WHEELS & AXLES - UNFUNDED (KXXX)

PROJECT DESCRIPTION:

This project is to replace non-serviceable wheel assemblies & axles on the transit vehicles.

PROJECT JUSTIFICATION:

Approximately 125 wheel assemblies, 35 axles and 250 tires/rims per year require replacement due to wear and damage during revenue operation. These components are replaced during normal maintenance.

REPLACE CARPET - UNFUNDED (LLXX)

PROJECT DESCRIPTION:

This project replaces carpet in the Lake Merritt & MetroCenter Administration buildings.

PROJECT JUSTIFICATION:

The carpeting in the Lake Merritt Administration building is badly worn and frayed at the seams causing a safety hazard for employees. The carpet on the 2nd floor of the Metro building is also badly in need of replacement.

ADDITIONAL REVENUE VEHICLES (145) - UNFUNDED (LXXX)

PROJECT DESCRIPTION:

This project is to purchase 145 Revenue Vehicles for capacity expansion and extensions.

PROJECT JUSTIFICATION:

Additional rolling stock is required to support basic system operations once Phase I Extensions are brought on line.

REFURBISH LANDSCAPING - UNFUNDED (MMXX)

PROJECT DESCRIPTION:

This project is to refurbish landscaping and install new sprinkler systems throughout the system where needed.

PROJECT JUSTIFICATION:

In some areas the District landscaping is in need of replacement. This project focuses on the installation of automatic sprinklers at 10 stations and planting drought-resistant plants on the C-Line.

REVENUE VEHICLE DOOR REHABILITATION - UNFUNDED (MXXX)

PROJECT DESCRIPTION:

This project will replace the side doors on the current fleet of revenue vehicles.

PROJECT JUSTIFICATION:

The present polyurethane filled side doors have absorbed moisture over the years and have swelled. This causes problems in operations when doors hang up in door pockets and will not properly open and close. In addition to swelling, moisture absorption causes the doors to lose their contour and require reworking. Vehicle Engineering has designed a new honeycomb sandwich door which will not be subject to moisture absorption. The new door would have a positive operational impact on the system as one of the most frequent failures on the transit vehicle is door-related.

REPLACE SIDE WINDING GATES - UNFUNDED (NNXX)

PROJECT DESCRIPTION:

This project replaces nine (9) side winding gates at applicable stations with motorized gates.

PROJECT JUSTIFICATION:

Debris causes the gates to jam open or closed. Replacement with motorized gates will reduce maintenance requirements to repair jammed gates and provide better security for the stations involved.

COMPUTER END USER NEEDS - UNFUNDED (NXXX)

PROJECT DESCRIPTION:

The purpose of this project is to purchase micro-computers and accessories throughout the District.

PROJECT JUSTIFICATION:

Over the past several years, the District has undertaken a study of the micro processing needs to provide compatibility and maximization of use. This project provides network capability that has been detailed in the District end-user survey, as well as yearly end-user needs.

REPLACE VARIOUS RADIO BASE STATIONS - UNFUNDED (OOXX)

PROJECT DESCRIPTION:

This project will replace Train Control Channel 2 (TC2), Police, & Yard Base Stations.

PROJECT JUSTIFICATION:

These base stations require replacement because they have reached the end of their useful life. TC2 is 20 years old, and the others are 14 years old.

AUTOMATIC FILLER MACHINES - UNFUNDED (RXXX)

PROJECT DESCRIPTION:

This project will replace automatic filler machines in the Cash Handling building.

PROJECT JUSTIFICATION:

BART currently has two homemade filler machines. These two homemade filler machines are unique. When parts require replacement, engineering is required to do the design as there are no drawings available. Both machines are old and unreliable.

SHREDDING MACHINE - UNFUNDED (SXXX)

PROJECT DESCRIPTION:

This project will purchase a new shredding machine to replace the current shredding machine.

PROJECT JUSTIFICATION:

This machine is 15 years old and parts are no longer available for it. This machine is used to shred tickets to avoid ticket fraud. BART Police also use it when they require shredding.

CASH CARTS - UNFUNDED (TXXX)

PROJECT DESCRIPTION:

This project replaces old cash carts at the Cash Handling Building.

PROJECT JUSTIFICATION:

The existing carts are 17 years old and require a complete overhaul of various components. Due to the age of the carts, it is more cost effective to replace them.

BILL STACKERS - UNFUNDED (UXXX)

PROJECT DESCRIPTION:

This project replaces old bill stackers at the Cash Handling Building.

PROJECT JUSTIFICATION:

These stackers have a useful life of 5 years and are nearing the end of their useful life. There is no benefit in repairing them once they are worn. Stackers provide secure transport of bills from CHB to the vendors.

REHABILITATE FARE TICKET TRANSPORTS - UNFUNDED (VXXX)

PROJECT DESCRIPTION:

This project provides for rehabilitation of fare ticket transports systemwide.

PROJECT JUSTIFICATION:

The ticket transports of all IBM and Cubic gates, vendors and addfares require refurbishing every five years. The overhaul includes replacement of bearings, rollers, belts, heads and printers.

EMBARCADERO MODULAR ESCALATORS - UNFUNDED (WXXX)

PROJECT DESCRIPTION:

This project provides for the rehabilitation and replacement of the Embarcadero Modular Escalators.

PROJECT JUSTIFICATION:

These escalators are nearly 20 years old and are of a different type than other station escalators and are not as reliable. Maintenance costs are currently $10,000/month.

REPLACE HYDRAULIC VALVES IN STATION ELEVATORS - UNFUNDED (YXXX)

PROJECT DESCRIPTION:

This project replaces Hydraulic Valve on station elevators.

PROJECT JUSTIFICATION:

These valves have never been replaced since initial operations, are leaking hydraulic fluid, and are experiencing increased failures.

REPLACEMENT NON-REVENUE VEHICLES & EQUIPMENT - 1994 - UNFUNDED (ZXXX)

PROJECT DESCRIPTION:

This project will replace Maintenance Equipment and Vehicles.

PROJECT JUSTIFICATION:

This project is to replace various sedans, vans, maintenance trucks, heavy maintenance vehicles and maintenance equipment due to normal wear.

SYSTEM SAFETY UPGRADE PH III - UNFUNDED (99*15)

PROJECT DESCRIPTION:

The purpose of this project is to provide miscellaneous support for the System Safety Upgrade project.

PROJECT JUSTIFICATION:

In 1979, BART experienced a fire in the Transbay Tube. The District subsequently hired the consultant firm of Gage-Babcock and Associates to perform a study of the system to determine whether or not there were safety deficiencies. The recommended modifications and improvements have been completed which have improved fire safety including transit vehicle fire hardening, improved fire hydrant connections in the Berkeley Hills Tunnel and improved communications capability. This project supports the final phase of the project.

LAND AND LAND RIGHTS - FUNDED (99*50)

PROJECT DESCRIPTION:

This project allows completion of basic system real estate transactions.

PROJECT JUSTIFICATION:

There are continuing miscellaneous costs associated with purchases of the original right-of-way.

AGENCY AND UTILITY AGREEMENTS - FUNDED (99*51)

PROJECT DESCRIPTION:

This activity represents payments due, when billed, for completion of basic system utility relocations, street closures, street restorations, drainage, etc., accomplished by various governmental agencies and utilities.

PROJECT JUSTIFICATION:

During initial system construction a number of utilities, streets, etc., needed to be relocated. In most cases BART paid governments and utilities to accomplish the work. Some of the work has not been billed to date.

OTHER COSTS (INSURANCE, BOND AGENTS, ETC.) - FUNDED (99*52)

PROJECT DESCRIPTION:

This activity covers costs associated with completion of the basic system including insurance, bond agent costs associated with the initial bond issue, contracts administration, etc.

PROJECT JUSTIFICATION:

Work is needed to continue meeting obligations made during initial system construction.

OUTSTANDING CLAIMS - FUNDED (99*54)

PROJECT DESCRIPTION:

This item represents a reserve against outstanding and potential claims arising out of the basic system construction.

PROJECT JUSTIFICATION:

This reserve is needed to meet potential obligations.

PROJECT DEVELOPMENT - FUNDED (99*55)

PROJECT DESCRIPTION:

This project covers costs associated with preliminary engineering and design which are necessary to bring projects to a stage of readiness where a grant application can be submitted. It also covers preliminary work on some BART funded projects.

PROJECT JUSTIFICATION:

For a project to be fully considered by UMTA or MTC for funding it must be "well defined". These costs cover work necessary to meet that requirement.

PLANNING & STATION AREA DEVELOPMENT - FUNDED (99*56)

PROJECT DESCRIPTION:

This is ongoing planning work associated with extensions, access, and joint development efforts.

PROJECT JUSTIFICATION:

Planning is needed to meet future capacity/operational requirements needs as well as to capture potential income associated with BART property around stations.

STATION AREA DEVELOPMENT INFRASTRUCTURE IMPROVEMENTS - FUNDED (99*59)

PROJECT DESCRIPTION:

These are costs associated with street, utilities, and other improvements needed to support joint development projects.

PROJECT JUSTIFICATION:

In order to achieve the greatest return on BART joint development projects, it is necessary to provide improvements to local facilities around BART stations.

IMPROVEMENT ALLOWANCE - FUNDED (99*66)

PROJECT DESCRIPTION:

This project represents miscellaneous work including capitalized maintenance projects, minor modifications to facilities, and urgent capital projects that are required sooner than can be accomplished by the five year lead on MTC programming.

PROJECT JUSTIFICATION:

These projects are necessary for maintaining the integrity of the basic operation.

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(Continued from inside front cover)

BART FACTS
FISCAL YEAR 1988/1989 DATA
(JULY 1988 - JUNE 1989)

FARES

Regular Adult: Rail fares are largely based on a distance formula ranging from 80¢ to $3.00. The face value for the average BART trip in FY 1988/89 was $1.55, including all MUNI Fast Pass trips at full value (80¢). The actual net average fare paid was $1.38, reflecting an 11% discount for the rail system. Regular express bus fares are 75¢ and $1.15 for one and two zone rides, respectively; rail patrons transferring to an express bus may obtain a free transfer worth 75¢.

Discounts: A maximum 6.25% rail fare discount is provided through the sale of $32 tickets for $30. Rail fares for handicapped persons, students 5-12 years of age, and persons 65 years of age and older are 10% of the regular adult fares. Children under 5 can ride free. Other discounts are provided through specially priced passes and/or ticket books for travel on BART express buses, San Francisco MUNI, and AC Transit.

Transfers: Free transfers can be made between all BART trains. Special agreements between BART and most other Bay Area operators permit up to a 50% discount for connecting transit service (on a round-trip basis).

PATRONAGE

Average Weekday: BART patronage averaged 207,231 trips per weekday in FY 1988/89. Of these trips, 101,319 (48.9%) occurred within the 4-hour peak travel period (2 morning hours plus 2 afternoon hours). Transbay trips constitute 48.6% of weekday travel with 24.6% Eastbay and 26.8% Westbay.

Weekends: Saturday ridership averaged 88,950 trips with 44.9% Transbay, 30.4% Eastbay, and 24.7% Westbay. Ridership for Sunday averaged 52,436 with market shares of 44.5% Transbay, 33.5% Eastbay, and 22.0% Westbay.

Total Ridership: Rail ridership totaled 60,457,004 trips in FY 1988/89, 1.8% above a forecast of 59,369,780.

CAPACITY

On-Line Requirements: BART currently operates a maximum of 45 on-line trains which require 90 A-cars, 248 B-cars, and 8 C-cars. In addition to these, 8 trains are held as ready spares requiring 16 A-cars and 24 B-cars.

Maximum Service Delivery: As of June 1989, scheduled peak hour capacity for the three Transbay routes serving downtown San Francisco and Oakland stations is 17 trains consisting of 159 cars (or 11,448 seats). For the Eastbay route, which also serves downtown Oakland stations, maximum peak hour capacity is 5 trains consisting of 24 cars (or 1,728 seats).

KEY PERFORMANCE INDICATORS

Train On-Time Performance: Daily on-time performance has consistently been above 90% since October 1980 and averaged 96.1% in FY 1988/89.

Scheduled Train Dispatches Completed: Performance has consistently been above 98% since January 1981 and averaged 99.1% in FY 1988/89.

Load Factors: Peak hour load factors during FY 1988/89 averaged 1.26 for Transbay service and 1.06 for the Eastbay route. Load factors for the shoulder period (approximately 45 minutes before and after the peak hour) averaged 1.17 Transbay and 0.93 for the Eastbay route. Maximum average load factors for offpeak service is 0.72 systemwide.

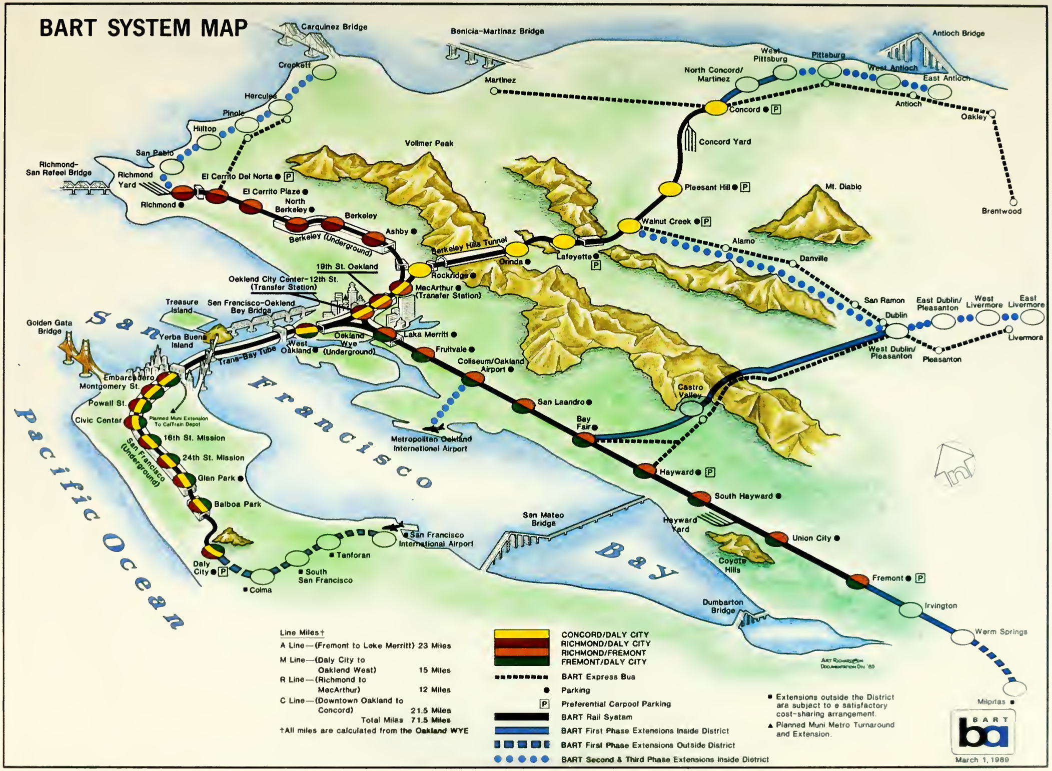
Peak Period Transbay Throughput: The percentage of scheduled Transbay capacity actually provided in FY 1988/89 is 98.0% for trains and 97.9% for cars.

OTHER PERFORMANCE DATA FOR FY 1988/89

PERFORMANCE DATA (1,000s)	
Total passengers	60,457.0
Passenger-miles	757,225.2
Car-miles	33,197.2
Car-hours	1,181.7
Rail operating cost	$157,586.3
Express bus cost	$6,906.3
Transfer/Shuttle bus cost	$7,723.6
Total operating cost	$172,216.2
Net passenger revenue	$83,192.0
Other revenue	$6,421.2
Total revenue	$89,613.2
Operating deficit	$82,603.0

PERFORMANCE INDICATORS	
Farebox ratio	48.31%
Operating ratio	52.04%
Passenger-miles/seat-mile	31.68%
Rail operating cost/passenger-mile	20.81¢
Rail operating cost/passenger	$2.61
Total operating cost/passenger	$2.85
Total operating revenue/passenger	$1.48
Total operating deficit/passenger	$1.37
Rail operating cost/car-hour	$133.36
Rail operating cost/car-mile	$4.75
Passenger-miles/car-hour	640.79
Passenger trips/car-mile	1.82

BART SYSTEM MAP



Line Miles†

A Line—(Fremont to Lake Merritt) 23 Miles
M Line—(Daly City to Oakland West) 15 Miles
R Line—(Richmond to MacArthur) 12 Miles
C Line—(Downtown Oakland to Concord) 21.5 Miles
Total Miles 71.5 Miles

†All miles are calculated from the Oakland WYE

🟨🟥🟧🟩	CONCORD/DALY CITY RICHMOND/DALY CITY RICHMOND/FREMONT FREMONT/DALY CITY
■■■■■■■■■	BART Express Bus
●	Parking
P	Preferential Carpool Parking
▬	BART Rail System
▬	BART First Phase Extensions Inside District
■ ■ ■ ■ ■	BART First Phase Extensions Outside District
● ● ● ● ●	BART Second & Third Phase Extensions Inside District

- ■ Extensions outside the District are subject to a satisfactory cost-sharing arrangement.
- ▲ Planned Muni Metro Turnaround and Extension.

BART

March 1, 1989

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S16
#64
1990-2000

BART

BAY AREA RAPID TRANSIT DISTRICT

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CAPITAL IMPROVEMENT PROGRAM

1990 TO 2000

Prepared by
Government & Community Relations

October 18, 1990

All projects discussed are subject to state and federal environmental review as required by law. Specific projects and project funding are subject to approval by BART's Board of Directors. Reference to projects that do not yet satisfy these requirements are proposed projects.

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A. EXTENSIONS

SAN FRANCISCO AIRPORT EXTENSION (12--)

PROJECT DESCRIPTION:

This project will extend the BART rail system from the proposed Colma Station to the vicinity of San Francisco Airport. The project includes vehicle purchase and general systemwide support.

PROJECT JUSTIFICATION:

This project is the second stage of the Daly City to San Francisco Airport BART rail extension. This extension is over six miles long and the AA/DEIR/DEIS is scheduled to begin in 1990.

DUBLIN-PLEASANTON EXTENSION-PHASE I (08AC)

PROJECT DESCRIPTION:

This project is an 11.6 mile, two-station BART extension from Bay Fair Station to Dublin. The project includes vehicle purchase and general systemwide support.

PROJECT JUSTIFICATION:

The State FEIR was approved by the BART Board of Directors in February 1990 and preliminary engineering was completed in March 1990.

NORTH CONCORD-WEST PITTSBURG-PHASE I (04AD)

PROJECT DESCRIPTION:

This project is for construction of Phase I of the Pittsburg-Antioch Extension, which is a 7.8 mile, two-station project. The project includes vehicle purchase and general systemwide support.

PROJECT JUSTIFICATION:

The federal AA/EIS was suspended in August 1988. The state EIR was completed in November 1988. From the state EIR, a preferred route alignment was identified (the same one described in the 1989 CIP) and BART was selected as the preferred mode. Preliminary engineering began in April 1989 and will be completed in 1991.

IRVINGTON-WARM SPRINGS EXTENSION(02AD)

PROJECT DESCRIPTION:

This project is to construct a 5.4-mile BART rail extension of the Fremont Line to the Irvington and Warm Springs Districts of Fremont. The project includes vehicle purchase and general systemwide support.

PROJECT JUSTIFICATION:

The federal AA/EIS for the South Bay has been suspended for BART. The state EIR and preliminary engineering are currently being conducted for the BART to Warm Springs Extension.

COLMA EXTENSION (12DA)

PROJECT DESCRIPTION:

This project is a one station rail extension from Daly City BART to the City of Colma.

PROJECT JUSTIFICATION:

The basis of the East Bay rail extensions program is the rail extension from the Daly City BART Station to the San Francisco Airport. The initial stage of this extension is the Colma Station. This extension is approximately one mile long and preliminary engineering and design is underway with funds from a Section 9 grant.

PHASE II EXTENSIONS R-O-W ACQUISITION (0-B-&)

PROJECT DESCRIPTION:

Acquisition of rights-of-way for proposed Phases II and III Warm Springs, Pittsburg-Antioch, Livermore-Pleasanton and West Contra Costa BART extensions.

PROJECT JUSTIFICATION:

Expenditures on critical rights-of-way and facilities are deemed necessary to ensure that viable route alignments remain available for rail extensions pending funding and AA/EIS/EIR work to identify the project for construction.

SAN FRANCISCO MUNI METRO (11AQ)

PROJECT DESCRIPTION:

This project is a Phase I San Francisco transit extension.

PROEJCT JUSTIFICATION:

BART has agreed to make a contribution to a Muni Metro rail exftnsion to the South-of-Market Caltrain Terminal. MUNI has lead responsibility for meeting planning requirements for this project.

B. ACCESS

ALAMEDA PARK/RIDE (01GG)

PROJECT DESCRIPTION:

The purpose of this project is to acquire land and construct a 100 space park/ride lot.

PROJECT JUSTIFICATION:

This 100-space park/ride lot will provide access to the BART rail system.

RAILROAD AVENUE PARK/RIDE (04IA)

PROJECT DESCRIPTION:

The purpose of this project is to acquire land and construct a 200 space park/ride lot.

PROJECT JUSTIFICATION:

This 200-space park/ride lot will provide access to BART Express Bus lines which feed the BART rail system. The funds for this project are from the Section 9 Pittsburg/Antioch urbanized area.

BRENTWOOD PARK/RIDE (04RA)

PROJECT DESCRIPTION:

This project will construct a 200-space park/ride lot in the City of Brentwood.

PROJECT JUSTIFICATION:

This project will construct a 200-space park/ride lot in the City of Brentwood on land previously acquired with BART funds. The funds for this project are from the Section 9 Pittsburg/Antioch urbanized area.

WALNUT CREEK ACCESS IMPROVEMENTS (03LG)

PROJECT DESCRIPTION:

First-year funding for this project provides for the design of bus transit interface improvements and approximately 1200 parking spaces (including site replacement spaces) in a multi-level structure on BART-owned land. Out year funding covers the construction phase of the project.

PROJECT JUSTIFICATION:

Existing Intermodal bus, kiss ride and parking access occur on the same two roads along the axis of the station platform.

The proposed project would provide for separate bus and kiss ride transfer areas, thus improving general circulation in the station. The physical configuration of the bus bays would be improved. Covered walkways and waiting areas would be provided at bus access points. There would be improvements in signage and schedule information. Major restructuring of the existing parking lot will be necessary to accommodate the multimodal access improvements. The project will include the following components:

Over the next five to seven years, CCCTA expects to reduce headways on nearly all routes serving Walnut Creek Station. Most routes serving Walnut Creek Station are now at 30-minute headways . By the mid 1990's, the headways on their routes will be between 10-15 minutes. This increased level of service implies that there will be additional conflicts at the station if no more bays/loading zones are provided.

CCCTA also expects to add approximately two more routes serving Walnut Creek by 1992/93. These new routes would serve the San Ramon Valley as well as provide a link to Lafayette and Orinda.

CONCORD ACCESS IMPROVEMENTS (03SN)

PROJECT DESCRIPTION:

This project provides for bus transit interface improvements and approximately 1635 parking spaces (including site replacement spaces) in a multi-level structure on BART-owned land.

PROJECT JUSTIFICATION:

The existing parking shortage severely limits midday station access, when ample rail patron capacity is available. The Concord Station patron parking shortage will be exacerbated by implementation of the Capacity Expansion Program, when additional capacity will become available during peak as well as off-peak periods.

The parking structure will be designed to provide additional parking within close proximity of the station entrance, and to expand the number of arriving carpool and handicapped patron spaces.

FRUITVALE ACCESS IMPROVEMENTS (01GH)

PROJECT DESCRIPTION:

First-year funding for this project provides for the design of bus transit interface improvements and approximately 860 parking spaces (including site replacement spaces) in a multi-level structure on BART-owned land.

PROJECT JUSTIFICATION:

The proposed project will provide a minimum of twelve bus bays and the separation of the bus and auto access improving general circulation, as well as street circulation in the vicinity of the station. In addition, kiss/ride and bus bays would be separated, improving flow for both modes.

This project also supports AC Transit's modified service grid system throughout the central core of its service area (Oakland, Berkeley, Alameda, Albany, Emeryville, and Piedmont).

A sawtooth design for bus bays will provide independent berthing for all buses. Covered wait and walk areas would be provided at the bus access points along with improved signage and transit information.

Significant restructuring of the existing parking lot is required to support improved multimodal access.

HAYWARD ACCESS IMPROVEMENTS (01OG)

PROJECT DESCRIPTION:

This project provides for bus transit interface improvements and approximately 1,200 parking spaces (including site replacement spaces) in a multi-level structure on BART-owned land.

PROJECT JUSTIFICATION:

The proposed project will provide a minimum of seventeen bus bays and the separation of the bus and auto access improving general circulation, as well as street circulation in the vicinity of the station. In addition, kiss/ride and bus bays would be separated, improving flow for both modes.

This project also supports AC Transit's modified service grid system throughout the central core of its service area (Oakland, Berkeley, Alameda, Albany, Emeryville, and Piedmont).

A sawtooth design for bus bays will provide independent berthing for all buses. Covered wait and walk areas would be provided at the bus access points along with improved signage and transit information.

Significant restructuring of the existing parking lot is required to support improved multimodal access.

WEST OAKLAND PARKING-LAND ACQUISITION (11EG)

PROJECT DESCRIPTION:

The purpose of this project is to purchase approximately twenty acres from Southern Pacific Transportation Company in order to construct a parking lot.

PROJECT JUSTIFICATION:

This proposed acquisition was authorized by the Board in December 1989. Acquisition of the property will enable BART to construct a parking lot adjacent to the West Oakland station. Construction of this lot will provide additional parking at this station.

DALY CITY INTERMODAL FACILITY (11U-)

PROJECT DESCRIPTION:

This project involves a number of improvements to the pedestrian, auto and bus circulation systems at the Daly City Station including implementation of a one-way circulation pattern on the station roadways, relocation the bus terminal area, relocation of the kiss/ride area, provision of covered grade separated pedestrian accessways and restriping the parking garage.

PROJECT JUSTIFICATION:

The Daly City BART Station operates as the western terminal station of the BART system and is the busiest BART station outside of downtown San Francisco. The station currently experiences operational problems which impact both the station's function and transportation conditions in the surrounding area which this project is expected to alleviate.

EL CERRITO DEL NORTE BUS ACCESS RENOVATION (05KH)

PROJECT DESCRIPTION:

The purpose of this project is to remodel the bus access area to increase bus stop locations from five to thirteen.

PROJECT JUSTIFICATION:

Implementation of this project will accommodate a new timed transfer center for AC Transit and will improve system access for bus riders.

ROCKRIDGE ACCESS IMPROVEMENTS

PROJECT DESCRIPTION:

This project is to construct a second level parking deck over the existing parking lot.

PROJECT JUSTIFICATION:

This project will provide approximately 425 additional parking spaces. Parking is severely constrained at this location and is further exacerbated by local parking restrictions that were imposed by the City of Oakland.

WEST LIVERMORE PARK/RIDE

PROJECT DESCRIPTION:

This project is to construct a park/ride lot on the site future proposed West Livermore BART rail station.

PROJECT JUSTIFICATION:

Construction of this park/ride will provide 153 parking spaces and will provide intermodal coordination with LAVTA and BART Express Bus service.

EL CERRITO DEL NORTE ACCESS IMPROVEMENTS (05K-)

PROJECT DESCRIPTION:

This project provides for bus transit interface improvements and approximately 1,200 parking spaces (including site replacement spaces) in a multi-level structure on BART-owned land.

PROJECT JUSTIFICATION:

The proposed project will provide a minimum of thirteen bus bays and the separation of the bus and auto access improving general circulation, as well as street circulation in the vicinity of the station. In addition, kiss/ride and bus bays would be separated, improving flow for both modes.

Significant restructuring of the existing parking lot is required to support improved multimodal access.

PLEASANT HILL PARKING STRUCTURE (03NE)

PROJECT DESCRIPTION:

The purpose of this project is to construct a multi-level parking structure on BART-owned land.

PROJECT JUSTIFICATION:

The construction of this structure will provide additional parking at this station.

PARKING AND ACCESS

PROJECT DESCRIPTION:

The purpose of this project is to expand parking capacity at eight locations.

PROJECT JUSTIFICATION:

The parking and access project is composed of the following nine construction activities:

Lake Merritt Parking Facility
Bay Fair Parking Facility
Orinda Parking Facility
Lafayette Parking Facility
Pleasant Hill Parking Facility
Hercules Park Ride Lot
MacArthur Parking Facility
El Cerrito Plaza Parking Facility

Completion of these activities will benefit passengers by facilitating access to the stations.

SAN LEANDRO BUS INTERMODAL

PROJECT DESCRIPTION:

The purpose of this project is to remodel bus access area to increase bus stop locations from four to twelve.

PROJECT JUSTIFICATION:

This project will accommodate AC Transits' new timed-transfer center and will improve system access for bus riders.

SOMERSVILLE ROAD PARK RIDE (04KA)

PROJECT DESCRIPTION:

The purpose of this project is to construct a park/ride lot on BART-owned land.

PROJECT JUSTIFICATION:

This project will improve access to BART Express bus service.

C. BASIC SYSTEM

WOMEN'S REST ROOM/LOCKERS & SHOWER - OHY (01SR)

PROJECT DESCRIPTION:

An existing men's rest room will be expanded and converted into a women's rest room with adequate shower facilities and locker space.

PROJECT JUSTIFICATION:

This project is required to accommodate the increased number of women working on the Hayward Shop floor. In the last eight years, the number of females employed in the shop has gone from five (5) to fourteen (14). There is only one women's rest room in the shop area, as compared to three men's rest rooms and locker and shower facilities.

REBUILD PAVEMENT AT FREMONT & UNION CITY (01V-)

PROJECT DESCRIPTION:

The Fremont and Union City pavement overlays will be redesigned and reconstructed to significantly improve their strength in order to handle heavier loads.

PROJECT JUSTIFICATION:

Bus and heavy traffic loads have caused the existing pavement to break up. Delays in repairing the pavement will result in further deterioration of the sub-base and increased cost to rebuild the composites. There is a potential for liability claims resulting from the deteriorated pavement.

WET STANDPIPE SYSTEM/SOUTH BORE-BHT (03FM)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install a Wet Standpipe system in the Berkeley Hills Tunnel (BHT) with outlets every 300 feet.

PROJECT JUSTIFICATION:

Fire services have no facilities available in the south bore of the BHT. This project is recommended by staff as an alternate to Gage Babcock Associates's recommendation (#18) of installing a second main in the south bore of the BHT and has been concurred with by the CPUC and it's consultants.

2 STAIRWAYS-PLATFORM/CONCOURSE-WOS (11DB)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install two additional stairways, one for each of two platforms, from the platform level to the concourse level at West Oakland station.

PROJECT JUSTIFICATION:

The emergency exiting time from the West Oakland platforms is currently 7.65 minutes, which exceeds the 6.0 minute limit agreed to by BART, the CPUC and the Fire Liaison Committee (FLC). Adding the additional stairways will bring the platform exiting times within the agreed upon time limits.

2 END STAIRWAYS-PLATFORM/CONCOURSE-EMS (11FG)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to install two additional stairways, one at each end of the station, from the station platform to the concourse at Embarcadero Station.

PROJECT JUSTIFICATION:

The emergency exiting time from the platform exceeds the 6.0 minute limit agreed to by BART, the CPUC and the FLC. Adding the additional stairways will bring the platform exiting times within the agreed upon time limits.

WET STANDPIPES-STATIONS & SUBWAYS (15AZ)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is to provide eleven (11) at grade stations with fire department connections and extend the station wet standpipe systems in twenty (20) above grade stations. Below grade, eight (8) failed dry standpipes will be replaced with new wet standpipes spaced 300 to 370 feet apart. Additionally, 60 cabinets will be installed in the stations for storage of fire hose at the connection points of the undercar sprinkler system.

PROJECT JUSTIFICATION:

The project will implement Gage Babcock Associates' recommendations Nos. 10 and 11 at stations that are not below grade. In subways, the failed dry standpipes must be replaced. Replacement with wet standpipes will satisfy part of Gage Babcock Associates' recommendation No. 13, at least for the 8 subway locations in question. The hose cabinets are an alternative to Gage Babcock

Associates' recommendation of directly connecting the undercar sprinklers, and has been concurred with by the CPUC and their consultant.

DRY STANDPIPES(56) - SUBWAYS (15BH)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and will replace the remaining 56 dry standpipes in the underground. These standpipes will have outlets every 300 feet and water flow of 500 GPM at 100 PSIG. This project is in addition to the wet standpipes being replaced under project 15AZ.

PROJECT JUSTIFICATION:

The project will complete the implementation Gage Babcock Associates' recommendation No. 13 ("Provide all underground line sections with wet standpipe systems...") which has been vigorously supported by the fire departments and has the endorsement of the CPUC, their consultant, and BART.

STATION ENTRANCE CANOPIES (15RB)

PROJECT DESCRIPTION:

The purpose of this project is to cover all exposed escalator and stairway entrances to subway stations.

PROJECT JUSTIFICATION:

BART presently has 43 escalators exposed to the elements. These units are located at 36 entrances of eight stations in Oakland and San Francisco. These units have significantly higher failure rates, take longer to repair and have a shorter life span than protected units. In addition, because they are exposed, they are more hazardous to patrons during inclement weather. Installation of covers over these exposed units would increase the reliability of these units and extend their useful life. There are 14 subway entrances, with stairs only, at downtown Berkeley, Oakland and San Francisco that are open to the weather. Enclosure of these entrances would improve station cleanliness and appearance and enhance security for patrons and employees.

ELIMINATE STATION INTERFACES (20AC)

PROJECT DESCRIPTION:

This project will provide the necessary interstation cables and complete the other required modifications to the train control equipment to eliminate the headway constraints at 11 locations.

PROJECT JUSTIFICATION:

This modification will allow continuous "following move speed profiles" across the interface, thus reducing the minimum headways between trains at critical locations. The present train control system does not have sufficient numbers of vital interstation cables necessary to pass the individual track circuit occupancies.

STATION BACKUP POWER (20HB)

PROJECT DESCRIPTION:

This project is intended to purchase and install equipment and batteries to upgrade the essential power systems in train control rooms.

PROJECT JUSTIFICATION:

Certain BART train control and communications equipment is supplied by essential power systems. These systems provide uninterruptable power during station power outages and isolate the supplied equipment from utility power system transient disturbances. Currently, uninterruptable power systems (UPS) furnish this essential power.

The original installations are now loaded to a point that certain critical equipment is not supplied by uninterruptible power systems. Some functions which are presently supplied by essential power will be replaced by new projects, but total demand will continue to be greater than the existing essential power capacity. Providing additional essential power would improve availability of voice and data communications between central control and field locations during periods of loss of power from the local utility.

The scope of this project is to provide for design, furnishing, and installation of equipment and batteries to upgrade the essential power systems in the train control rooms of 31 stations (three stations have been handled by earlier contracts), three yards, three ventilation structures and one portal structure for new and existing systems.

Upon completion of this project, existing essential power supply equipment would be replaced at all 38 locations with new static-type uninterruptible power supply equipment similar to the existing equipment, but of a larger capacity. Existing battery capacities at all locations would be sized to one and one-half hour capacity.

RADCOM MODIFICATIONS - CENTRAL CONTROL (27OC)

PROJECT DESCRIPTION:

The purpose of this project is to install upgraded electronic equipment in Central Control.

PROJECT JUSTIFICATION:

This project provides for the replacement of obsolete electronic equipment in Central Control such as computer consoles; and also includes replacement of the flooring. Installation of upgraded equipment will enhance the ability of Central operations and maintenance personnel to perform their duties.

REGIONAL MULTI-OPERATOR PASS (44–)

PROJECT DESCRIPTION:

The purpose of this project is to develop on-board validator hardware and software for installation on Central Contra Costa Transit Authority (CCCTA) and BART Express buses. In addition, credit/debit machines will be installed at stations serving CCCTA and BART Express buses. Machines will also be installed at heavy traffic stations in downtown San Francisco.

PROJECT JUSTIFICATION:

This demonstration project will develop the hardware and software required to provide total, regional multi-modal transfers with just one ticket. The initial phase encompasses development and installation of on-board validators on one hundred eleven Central Contra Costa Transit Authority (CCCTA) buses, which serve five BART stations and on BART Express buses which serve five stations. The stored value equipment will provide for transfers among operators, with the capability to provide for operator discounts at multiple levels. The on-board equipment will act like a BART gate, subtracting fare from a stored value ticket, with the amount depending on whether a connecting BART trip is being made. As more operators are added (Phases II and III), the equipment will keep track where tickets are used to facilitate revenue sharing among operators. In addition, debit/credit vending machines will be installed to distribute tickets, as well as modifications made to the existing BART faregates in order to accommodate this new equipment. Machines will also be installed at heavy traffic stations in downtown Oakland and San Francisco.

IBM TICKET TRANSPORT RETROFIT (45BF)

PROJECT DESCRIPTION:

This project is to retrofit ticket vending machines, addfare machines and fare gates with updated components.

PROJECT JUSTIFICATION:

IBM fare machines in some locations have been operating continually for over 15 years. Examination of the ticket handling mechanism (THM) of two fare gates and one ticket vendor reveals that 60-90% of the moving components are sufficiently defective to require replacement with updated components.

9 VENDORS AND 8 ADDFARES (47BA)

PROJECT DESCRIPTION:

The purpose of this project is to procure nine (9) ticket vendors and eight (8) addfare machines to be installed at various BART stations.

PROJECT JUSTIFICATION:

Based on a comparison of a simulation model and systemwide performance criteria, AFC deficiencies were identified. Primarily, these deficiencies are unacceptable levels of patron queuing at exit faregates, ticket vendors and addfares. To overcome these deficiencies, it was determined that seven vendors and seven addfares would have to be procured. In addition, faregates now in storage would be modified to current baseline configuration and installed.

The benefit of this project is improved convenience to passengers during the peak period. This project is required to maximize the benefits of BART's Capacity Expansion program. The Capacity Expansion program is nearly funded and represents a major commitment of federal, state, local and BART funds. Without smaller projects such as this one, BART is put in the position of providing greater capacity for service in a manner that is inefficient and inconvenient for passengers.

This project includes the installation of 2 vendors and one addfare at Daly City Station to support the Daly City Intermodal project.

PB&R INFO PROCESS NETWORK-EUC (65ED)

PROJECT DESCRIPTION:

This project will provide for additional computers in the Planning, Budget and Research (PB&R) department which will be linked together over a network for information sharing purposes.

PROJECT JUSTIFICATION:

The additional computers and computer network will enable the PB&R department to support BART's extension projects without major staff increases. This additional support is gained through increased productivity.

E&C PROJ MGT NETWORK SYST-PH.2 (65HC)

PROJECT DESCRIPTION:

The project provides for a tailored PC-based cost/schedule control system that is linked to the District's mainframe-based Financial Management System. The project will provide an integrated scheduling and cost control system at the project management level. This part of the project is Phase II of a four phase project which is described below.

PROJECT JUSTIFICATION:

The project consists of four phases:

- Phase I, which is essentially complete, provides for the initial data base design and link to BART's mainframe system
- Phase II, which is this project, prototypes the network design, then implements the network with five departments participating.
- Phase III provides for PC/networking implementation for the Extensions Department Facility and direct networking to E&C for shared use of the Project Management/Tracking Program data base.
- Phase IV has been identified as total PC networking for Maintenance and Engineering departments.

The project is required to provide electronic integrated scheduling, cost control, reporting and project management system tools, at the project management level. Completion of this project meets UMTA requirements for Project Control, electronic Critical Path Management (CPM) scheduling, and reporting of Federally funded projects. Capital Programs will use the Project Management data as input to UMTA's Grant Management Information System (GMIS) network.

E&C PROJ MGT NETWORK SYST-PH.3 (65HD)

PROJECT DESCRIPTION:

This four phase project provides for a tailored PC-based cost/schedule control system that is linked to the District's mainframe-based Financial Management System. The project will provide an integrated scheduling and cost control system at the project management level.

PROJECT JUSTIFICATION:

The project is required to provide electronic integrated scheduling, cost control, reporting and project management system tools, at the project management level. Completion of this project meets UMTA requirements for Project Control, electronic Critical Path Management (CPM) scheduling, and reporting of Federally funded projects. Capital Programs will use the Project Management data as input to UMTA's Grant Management Information System (GMIS) network.

Phase III provides for PC/networking implementation for the Extensions Department Facility and direct networking to E&C for shared use of the Project Management/Tracking Program data base.

FOUR TRACTOR/TRAILER ARMORED TRUCKS (68DE)

PROJECT DESCRIPTION:

The purpose of this project is to replace four armored trucks with armored tractor-trailer trucks.

PROJECT JUSTIFICATION:

Four armored vehicles are currently used for handling and transporting cash. The current fleet of trucks is overage and overdue for retirement. In addition, the present fleet will be unable to handle the increased demands for handling and transporting cash as a result of the Capacity Expansion Program.

MEGAPHONES FOR T/O'S (79KB)

PROJECT DESCRIPTION:

This project is part of the System Safety Improvements and is for the purchase of megaphones for use by Train Operators.

PROJECT JUSTIFICATION:

The project will satisfy a Gage Babcock Associates' recommendation that is supported by the fire departments and the CPUC. Megaphones are believed to enhance the communication ability of the Train Operators during emergency evacuations.

FEMA REIMBURSEMENT PROJECT (94–)

PROJECT DESCRIPTION:

The purpose of this project is to support a claim filed with the Federal Emergency Management Agency (FEMA). Includes "High Priority" asbestos repairs.

PROJECT JUSTIFICATION:

FEMA reimbursement for the District's claim will reimburse the District for repairs to damage resulting from the October 17, 1989 earthquake.

CALTRANS SEISMIC FREEWAY (07BC)

PROJECT DESCRIPTION:

The purpose of this project is to temporarily relocate BART systems to allow seismic upgrade of CalTrans 580/24 Freeway Interchange Overcrossing support columns.

PROJECT JUSTIFICATION:

BART must relocate, using CalTrans' contractor, power, train control, and communication systems to allow CalTrans to reinforce freeway columns which are located on the BART right-of-way near the MacArthur station. After CalTrans has completed its upgrades, planned for this year, the systems must be replaced into their permanent locations. All BART work and participation will be at CalTrans expense.

LAFAYETTE STATION TILE REPLACEMENT (031D)

PROJECT DESCRIPTION:

The purpose of this project is to replace existing tile at entrance to Lafayette Station with non-skid tile.

PROJECT JUSTIFICATION:

Existing tile has an oil finish and will not accept a non-skid surface. This condition creates an extreme slipping hazard during wet weather.

REPLACE AC/MUNI TRANSFER MACHINES (47CA)

PROJECT DESCRIPTION:

The purpose of this project is to replace sixteen Muni and twenty AC bus transfer machines.

PROJECT JUSTIFICATION:

This program was approved in July 1989. These transfer machines have never been replaced and experience an unacceptably high failure rate.

CAPITAL PROJECTS UNDER $100,000

PROJECT DESCRIPTION:

The purpose of this project is to fund miscellaneous capital projects under $100,000.

PROJECT JUSTIFICATION:

This program replaces the former Capital Improvement Allowance fund.

CAPITAL PLANNING PROJECTS

PROJECT DESCRIPTION:

The purpose of this project is to fund the planning and environmental phases of various access, Extensions, Access and Basic System projects.

PROJECT JUSTIFICATION:

This program funds the West Contra Costa County Corridor Study; the ESP study; the Oakland Airport Connector Study; and EIR's for parking projects at Union City, West Oakland, Fruitvale, Walnut Creek and Concord Stations. These studies are important planning efforts in support of the Basic System, Extensions and Access programs.

INDIRECT PLANNING SUPPORT

PROJECT DESCRIPTION:

The purpose of this project is to provide capital funds for specific staff functions in various departments.

PROJECT JUSTIFICATION:

This program funds staff responsible for managing capital program control activities, capital funding, preparation of government reports and joint development activities.

REPLACE A/B SIDE DOORS (41FB)

PROJECT DESCRIPTION:

The purpose of this project is to replace the existing polyurethane filled side doors on the A/B cars with doors.

PROJECT JUSTIFICATION:

The A/B car fleet contains polyurethane foam core side doors. Moisture from rain, dew and cleaning migrates into the foam through the window seal. The polyurethane absorbs the moisture which subsequently causes the foam to swell. The swelling causes the doors to bulge and bind in the door pockets. This binding prevents the doors from closing properly and prevents a train from leaving the station until the train operator finds the problem door and disables its operation. In addition, the mechanical alignment mechanism of the A/B car doors (anti-rattle blocks) is unreliable and needs replacement.

In 1988 and 1989, door failures caused 13.5% and 15.5% respectively of all rush period train delays. The situation has deteriorated further in 1990. Currently two offloads per day are caused by door failures. As the age of the doors increases, the number of swollen doors causing delays will further increase.

NEW C2-CAR BASE SYSTEM

PROJECT DESCRIPTION:

The purpose of this project is to procure twenty new transit vehicles.

PROJECT JUSTIFICATION:

The implementation of the Extensions program and projected patronage growth for the existing system require additional transit vehicles. Initially these vehicles will be used as replacements for A and B cars which will be undergoing rehabilitation. At a future time, depending upon patronage on the basic system, the cars may be charged to expansion service on an extension.

EQ - STANDBY POWER 15–C)

PROJECT DESCRIPTION:

The purpose of this project is to install at least four engine generators, one on the West Bay, one on the East Bay, one at the Transbay Tube and one at the Berkeley Hills Tunnel East Portal to allow systemwide operation in the event of a 480 volt utility power loss due to an earthquake or some other catastrophe.

PROJECT JUSTIFICATION:

After the October 17 earthquake, many downtown stations were without 480 volt power. This power is essential for the operation of station lighting, line pumps and line fans. Emergency lights are designed to last up to 30 to 90 minutes and essential power (life safety) is designed for up to 90 minutes. The line sump south of Powell Street Station came close to flooding the tracks and would have were it not for a borrowed mobile engine generator. It was fortunate that the Tube leak was very minor and that 480 volt power was available to the Tube pumps from Oakland.

REPLACE DESTINATION SIGN COMPUTER - STUDY (91AH)

PROJECT DESCRIPTION:

This project is to study the feasibility of replacing the existing train destination sign computer.

PROJECT JUSTIFICATION:

The study supports the train destination sign replacement project. The train destination sign controls displays on the electronic signs in the stations.

REPLACE MAINTENANCE VEHICLES & EQUIP

PROJECT DESCRIPTION:

This project is to replace maintenance and service vehicles and maintenance equipment.

PROJECT JUSTIFICATION:

BART's maintenance equipment gradually becomes worn from age and usage. Eventually it becomes more economical to replace the old equipment rather than repair it. Vehicles and equipment that have met the established replacement criteria must be replaced. The ongoing equipment replacement program assures that old, worn out equipment is replaced in a timely manner to minimize overall costs and ensure personnel safety. If this equipment is not replaced, overall costs will increase and maintenance crews will be disrupted by failed equipment.

This maintenance equipment typically includes such items as electric and pneumatic grinders and hand tools, portable light and power generator sets, light towers, air compressors, electric carts for transporting personnel and material, electric cart battery chargers, commercial lawn mowers, ground maintenance equipment, vacuums, floor scrubbers, polishers and various floor maintenance equipment; shop equipment such as jacks, jack stands, saws, drills, engine test equipment, electric and electronic meters, gauges, and test instruments and equipment.

BART has a fleet of light-duty highway vehicles to transport personnel and necessary equipment to work sites in the District. In addition, BART police and District personnel use sedans for regular duties. These vehicles are selected for replacement according to a consistent procedure developed by BART staff. Generally, the policy requires that sedans and pickups must be replaced after 70,000 miles and vans and police cars after 90,000 miles. At current usage rates, an average of 40 light-duty vehicles must be replaced each year. On the average, this is equivalent to replacing each vehicle every five years. However, heavily used vehicles are replaced more often while lightly used vehicles are replaced less often.

Heavy-duty maintenance vehicles also need periodic replacement. Maintenance personnel use these vehicles, which include diesel trucks, tractors, and track-maintenance vehicles, to repair and maintain BART's physical plant and to respond to emergencies. These vehicles' costs and useful lives vary widely.

STATION REPLACEMENT AND REHABILITATION

PROJECT DESCRIPTION:

This project is comprised of separate tasks which will replace various station-related items at stations as well as rehabilitate these stations.

PROJECT JUSTIFICATION:

Passengers will directly benefit due to added comfort and convenience. Maintenance efficiencies result when old equipment is replaced with modern equipment.

The project includes the following tasks: Replace escalators at Ashby Station, repair and restripe parking lots, repair all walks and concrete, repair station roofs, rehabilitate stations agents' booths, repair/replace landscaping, repair irrigation systems and replace irrigation controls.

PUBLIC SAFETY REPLACEMENT PROJECTS

PROJECT DESCRIPTION:

This project is to replace station fire alarms, systemwide line vent fan blade mounts, and two line vent fans.

PROJECT JUSTIFICATION:

The 32 station fire alarm systems are an integral part of the BART fire safety network. Existing facilities are equipped with smoke detectors, rate-of-rise temperature sensors, and sprinkler water flow alarms that annunciate at BART central. The fire alarm systems are over 20 years old and are obsolete. Parts are no longer available and they experience a high failure rate. Maintenance costs are significant because replacement parts must be specially manufactured. New alarms will save on maintenance costs as well as provide improved capability to identify the specific location within a station that experiences an alarm. This safety feature does not exist on the current station fire alarm system.

Systemwide, 78 line vent fan blade mountings must be replaced so that rotors and blades will not experience high stress concentrations that lead to stress-corrosion cracking and possible catastrophic failure. After replacing the mounting the fans must be rebalanced. Two vent fans in the Oakland Wye must be replaced with higher horsepower fans so that backlayering (commonly known as the chimney effect) will not take place when the fans are in the exhaust mode. These replacements will reduce the level of maintenance that is now done. Adequate ventilation must be assured in order to make the tunnels safe.

REPLACE MIS COMPUTER SYSTEM

PROJECT DESCRIPTION:

This project is to replace the MIS computer system, including the mainframe, peripheral subsystems, and software.

PROJECT JUSTIFICATION:

The management information system at BART supports general administrative functions as well as provides support for various operations and maintenance reporting systems. This centralized system provides support for the accounting system, the capital cost control system, the inventory control system, the data acquisition system that tracks patronage statistics, train sizing and scheduling, scheduling of operations personnel, and tracking maintenance records for each revenue vehicle including scheduling preventive maintenance. All of this data allows BART to analyze and forecast patronage, provide the rolling stock required to support these forecasts, and provide operating and maintenance performance reporting. With the continued implementation of the Capacity Expansion Program, additional computer capacity will be required to support additional rolling stock, inventory, and various reporting systems.

A number of departments in the District require specialized computer capability to carry out the responsibilities described above. In January 1987, the Management Information Systems Department published a report on the computer end user needs for the District. This report identified Districtwide software needs as well as the necessary hardware, support and training in order to implement the program. The report determined that the District's needs included a project management system, business graphics, business planning and modeling, information retrieval, and data query, reporting and extraction capabilities.

All of these management information systems projects have been planned and coordinated on a District wide basis. These projects portray the District's computing needs for the next 5-7 years.

REPLACE ELECTRICAL CORROSION CONTROLS

PROJECT DESCRIPTION:

This project is to replace the yard stray current controls and the Transbay Tube Cathodic protection, both of which control corrosion.

PROJECT JUSTIFICATION:

This is an important replacement project because of its impact on passenger safety.

When the Transbay Tube was installed, the steel skin was reduced from 1/2 inch to 3/8 inch as a cost saving measure. Cathodic protection was installed to maintain the integrity of the steel skin, which is critical to the structural strength of the tube. Without protection the tube will corrode and fail.

The first part of this corrosion control project is to replace about 1/3 of the 30 anode arrays that are weak or inoperative due to cable or array damage or due to the end of anode life. Replacement will restore tube skin cathodic protection.

The second part of this project is to re-insulate the rails in the San Francisco approach tunnels to interrupt stray current. Stray currents corrode rails and approach tunnels and interfere with the TBT cathodic protection.

The third part of this project is to re-insulate yard/shop track interfaces in order to reduce stray currents. Separation of the traction power for the local/shop area from the yard area will limit damage caused by stray currents originating from the local/shop areas. Stray currents corrode structures systemwide and pipes in the yards.

Replacement of these electrical corrosion controls is urgently needed to ensure that the Transbay Tube is structurally sound and that structures and pipes systemwide are not corroding.

REHABILITATE TRANSIT VEHICLES

PROJECT DESCRIPTION:

This project is to rehabilitate the existing fleet of A and B cars.

PROJECT JUSTIFICATION:

This rehabilitation project has direct passenger benefit and will achieve efficiencies in operations and maintenance. Passenger benefits include increased comfort (due to more comfortable seats and clean interiors) and increased service quality (since the rehabilitated cars will be more reliable due to new, state of the art components). Increased service quality will result in internal system productivity because more reliable vehicles translates to less maintenance (hence, cost savings).

The first phase of BART's transit vehicle rehabilitation project includes replacement of wheels, axles, seats and doors. Each year 125 wheels and 35 axles are replaced on the transit vehicles due to normal wear. Replacement will result in smoother rides to passengers.

Phase II is the long term portion of this project and is the complete overhaul and rehabilitation of the A and B cars. These cars are nearly 20 years old and various components are not cost effective to repair. Spare parts are becoming hard to find as these components become obsolete. This phase includes the complete overhaul of the vehicles as well as supporting facilities necessary to support the rehabilitation process. The rehabilitated vehicles will be more reliable, causing fewer delays and offloads, which will greatly benefit the passengers. In addition, fewer failures means less corrective maintenance, thereby improving efficiencies in maintenance.

PASSENGER INFORMATION SYSTEMS

PROJECT DESCRIPTION:

This project will enhance passenger information by providing train destination and train location information and upgrading the public address system.

PROJECT JUSTIFICATION:

The Destination Sign System (and computer) controls displays on the electronic signs in the stations. The system must be replaced due to obsolescence and unreliable performance. Unreliable performance cannot be tolerated with systems that provide information to the paying passengers. The replacement system will incorporate automatic train announcement capability which is visual and will benefit the hearing impaired. There may be an opportunity for revenue enhancement through the availability of additional commercial capacity.

The Destination Sign System announces when trains are at the platform and when the next train will arrive, but it is important for passengers to see more train information in a graphical way. Video displays or train information at all stations will provide actual train locations. Specific train location information will allow passengers the ability to fine tune their travel time management in stations. Passengers will be able to determine if they have the time to use phones and restrooms or if they must proceed rapidly to the platform for an approaching train. The Train Information Monitor will show train locations continuously.

The existing station Public Address systems must be replaced due to age and environmental conditions which have affected the hardware and functionality of the system. The ability to provide vital, intelligible information to both passengers and operations personnel has become impaired. This situation impacts adversely on passengers and becomes a safety concern during emergency situations.

PUBLIC SAFETY ENHANCEMENT PROJECTS

PROJECT DESCRIPTION:

This project is to enhance the public's safety through modification of existing systems and implementation of others.

PROJECT JUSTIFICATION:

This project will directly benefit passengers by providing a safer system. The project is comprised of separate tasks, many of which have been agreed to by the Fire Liaison Committee (FLC), CPUC and BART as necessary to complete in order to make the system safe to the satisfaction of the CPUC Administrative Law Judge.

The project consists of the following tasks: Upgrade maintenance telephone for Fire Department use, Remove obstructions on underground catwalks, Remove handrail gaps systemwide, Install non-skid finish to vehicle's emergency plank, Install redundant power/indicators to Transbay Tube (TBT) dampers, Install additional blue light fixtures, Implement fire base station annunciation, and Upgrade police radio system and coverage and procure police equipment.

ELDERLY & HANDICAPPED PROJECTS

PROJECT DESCRIPTION:

This project is to replace elevator components and to remove architectural hazards in stations systemwide.

PROJECT JUSTIFICATION:

Certain architectural features at various stations pose potential safety hazards for passengers, particularly those people who have visual impairments. Modification, redesign or replacement of these architectural features will eliminate safety hazards. Changes may include replacing sharp edges and corners, making objects detectable to a person using a cane, etc. Disability mobility instructors have assisted BART with identifying the potential architectural hazards. Based on that input, the BART Elderly and Handicapped Task Force included the architectural hazards project in their Accessibility Program Project Status Report. The District's safety department has reviewed this project and concurs with the need to eliminate potential safety hazards.

There are 64 station elevators throughout the system that are for the benefit of passengers with mobility restrictions. These elevators are critical to BART's ability to deliver service to the handicapped community. BART's station elevators, which previously allowed only Station Agent operation, recently have been modified for self operation if no Station Agent is available. The modifications include installation of simple push button intercoms, electronic access card readers and close circuit television cameras. The elevators are approximately 20 years old and have never had a major overhaul. The hydraulic valves in the elevators require replacement in order to reduce the number of failures that the elevators currently experience. The old hydraulic valves are leaking hydraulic fluid which could create a safety problem. Also, the sills surrounding the elevator openings have deteriorated due to continuous exposure to the weather. Replacement of these components will increase maintenance efficiencies and provide for reliable elevator operation.

AUTOMATED DOCUMENTATION, CAD & CONFIGURATION CONTROL

PROJECT DESCRIPTION:

This project will computerize the District's documentation storage and retrieval.

PROJECT JUSTIFICATION:

The installation of an automated documentation, CAD and configuration control computer system will increase the District's internal system productivity and efficiency.

The project will automate the District's document base used for real property, configuration control, facilities records, and maintenance and engineering changes. The CAD computer will allow the District to utilize vendor supplied CAD electronic files, otherwise these files will be useless. Automation will provide more efficient record keeping and control. At present, the District has over 100,000 drawings in its document base which could be handled more effectively if automated. With extensions just beginning, many more documents and drawing are anticipated.

ENHANCE TRAIN RADIO SYSTEM COVERAGE

PROJECT DESCRIPTION:

This project will alleviate train radio communication problems.

PROJECT JUSTIFICATION:

Enhancement of the train radio system coverage is necessary to promote public safety and security. Without the modifications, certain areas with train radio coverage problems will have to be covered with more cumbersome methods such as waiting to get to an area with radio coverage before communicating, or relaying the communication through other trains or radios. The train radio must adequately and reliably cover the entire BART system.

SYSTEMWIDE REPLACEMENT PROJECTS

PROJECT DESCRIPTION:

This project is to replace various computer systems and equipment systemwide that are beyond economic repair.

PROJECT JUSTIFICATION:

This project is completely replacement in nature. This project will increase internal system productivity because the maintenance of these items will be more efficient.

This project consists of the following tasks: Replace 2 20-channel logger recorders; Replace 56 line sump pumps in tunnels and subways; Replace Transbay Tube (TBT) lighting - lower gallery; Replace Data Acquisition System (DAS); Replace Sequential Occupancy Release System (SORS); and Replace the HVAC at Lake Merritt Administration Building (LMA).

REPLACE AND REHABILITATE MAINTENANCE SHOPS AND REPLACE HEAVY EQUIPMENT

PROJECT DESCRIPTION:

This project replaces various parts of the maintenance shops and heavy equipment.

PROJECT JUSTIFICATION:

This project is completely replacement/rehabilitation in nature. This project will increase internal system productivity because the maintenance shops will be more efficient. This increased efficiency translates directly to passenger benefits because vehicles in for maintenance will be turned-around quicker.

This project consists of the following tasks: Replace 25 electric-powered carts and chargers, replace HVAC, Replace Hayward shop vehicle wheel press,Replace Hayward shop wheel truing machine, Replace yard disconnect enclosures, Replace shop roll-up doors, Replace transit vehicle washers, Replace radio base stations at Hayward yard, Replace shop roofs, Replace/rehabilitate paved area and lighting, Rehabilitate Hayward heavy repair shop, and Repaint shop floors.

RAIL REPLACEMENT

PROJECT DESCRIPTION:

The purpose of this project is to replace rail and rail components throughout the system.

PROJECT JUSTIFICATION:

This project benefits transit passengers directly by ensuring a smooth ride by eliminating worn rail. In addition to the rail replacement, various components of the trackway must be replaced. These components include rail lubricators, insulated joints, direct fixation rail fasteners, timber at 14 different maintenance of way access points, and wooden ties on the Concord Line. None of these components have ever been replaced, all are nearly 20 years old and all are failing with increased frequency.

REPLACE YARD ELECTRIC CART (79NC)

PROJECT DESCRIPTION:

The purpose of this project is to replace fifteen electric carts in the yards.

PROJECT JUSTIFICATION:

The electric carts are an efficient way to transport personnel around the train yards. The existing carts are old and require frequent repairs.

REPLACE CASH HANDLING EQUIPMENT

PROJECT DESCRIPTION:

This project is to replace a variety of cash handling equipment that is obsolete and not cost effective to repair.

PROJECT JUSTIFICATION:

This project is necessary to replace cash handling equipment that is obsolete and difficult to maintain. Maintenance efficiencies will be increased if the equipment is replaced. This project replaces automatic filler machines, bill stackers, 49 cash carts, coin magazines, a shredding machine, a bill sorter, counting machines and ticket encoders.

REPLACE AUTOMATIC FARE COLLECTION EQUIPMENT

PROJECT DESCRIPTION:

This project is to replace various automatic fare collection equipment.

PROJECT JUSTIFICATION:

This replacement project will directly benefit the passengers and will enhance maintenance efficiencies.

The 66 existing Cubic Fare Gates must be replaced because they are beyond economic repair. They are unreliable and a hindrance to efficient passenger flow through the stations. Replacement will improve passenger flow and enhance maintenance efficiencies.

The 2 existing Ticket Encoders must be replaced because they are sensitive to variations in ticket stock. This results in many ticket jams and inefficient use of labor during the encoding process. Maintenance efficiencies will be increased if the encoders are replaced.

The existing fare gate barriers are pneumatic and are becoming obsolete. As units fail they become increasingly difficult to repair because the compressors are no longer manufactured and suitable replacements cannot be found. Replacing the pneumatic type with electric driven units will make the gates more reliable. This is a positive impact on passengers going through the gates. Maintenance will be reduced, thereby increasing efficiencies.

Replacement of the existing 122 IBM Ticket Vendors is necessary because these units do not have change making capability or bill stackers. A ticket vendor with change making capability will improve passenger flow as the passenger requiring change will have only one transaction to complete instead of the two now required. Also, the addition of the change making feature to the vendor will allow the District to remove the change machines associated with the ticket vendors.

This will result in substantial savings in maintenance and treasury costs. This replacement will positively impact passengers as well as increase maintenance and treasury efficiencies.

EARTHQUAKE PREPAREDNESS

PROJECT DESCRIPTION:

This project will enable the District to more quickly respond to earthquakes and other emergencies.

PROJECT JUSTIFICATION:

This project is comprised of various tasks to increase the safety of the BART system in the event of earthquakes, and to allow the District to respond more rapidly to earthquakes and other emergency events. This project will benefit passengers by increasing safety.

The various tasks in this project include: Installation of restraint brackets on overhead cranes, Installation of restraint clamps on shop vehicle supports, Installation of seismic monitors at critical points, and construction of heliports.

CASH HANDLING BUIDLING EXPANSION (QXXX)

PROJECT DESCRIPTION:

The purpose of this project is to expand the existing cash handling building.

PROJECT JUSTIFICATION:

The existing cash handling building is not sufficient to accommodate the continually expanding cash handling operations.

SHOP & YARD ENHANCEMENTS

PROJECT DESCRIPTION:

This project consists of various tasks that will enhance the shop and yard operations.

PROJECT JUSTIFICATION:

These shop and yard enhancements will increase internal system productivity by making the maintenance operation more efficient. Improved efficiencies will benefit passengers by ensuring that revenue vehicles are turned-around more rapidly after maintenance, thereby increasing vehicle availability.

This project is comprised of the following tasks: Add additional 1000 volt capacity to shop pits, Install switch point protectors in yards, Install doors on maintenance shops, Yard tower data network, Area building addition for component repair at Hayward, Construct Daly City shop wheel truing pit and machine, Construct painting building for transit vehicles, and Install second wheel press at Hayward.

TRAIN OPERATOR BREAK ROOM MODIFICATIONS (05NF)

PROJECT DESCRIPTION:

This project will provide additional locker, rest room, and break room facilities at Richmond Yard.

PROJECT JUSTIFICATION:

This project rehabilitates and expands the existing Richmond transportation building for maintaining existing levels of service by providing for adequate rest room and locker capacity for train operators.

RENEW & UPGRADE PAVEMENT/LIGHTING - OHY

PROJECT DESCRIPTION:

This project is to resurface, restripe and re-lamp the shop parking lot and access road.

PROJECT JUSTIFICATION:

Age, use and deteriorated condition of shops parking lots present a safety hazard to shop personnel and visitors. Relamping lots would decrease incidents of vandalism and provide a safe environment.

MULTI-DENOMINATION BILL VALIDATORS (45AN)

PROJECT DESCRIPTION:

The purpose of this project is to replace 180 two denomination validators with fur denomination validators.

PROJECT JUSTIFICATION:

This project will provide greater flexibility for patrons when purchasing tickets and will reduce currency piece count by 25 percent.

PROJECT TRACKING SYSTEM - PHASE IV

PROJECT DESCRIPTION:

This project provides total PC networking and database enhancements for the Engineering & Maintenance Departments.

PROJECT JUSTIFICATION:

A network of personal computers linked t the networks in the Engineering and Extensions Departments will provide the Maintenance Department and supporting staff with automated a project management and administrative tools. These tools will provide efficient methods of project costing, scheduling and tracking, and will produce project reports that are consistent throughout the Operations Department.

750/850 VOLT SYSTEM PERFORMANCE TEST (41BV)

PROJECT DESCRIPTION:

This project will determine the performance of A and B cars when the line voltage is between 850 and 750 volts.

PROJECT JUSTIFICATION:

The transit vehicles (A/B cars) are supposed to reduce their performance in terms of acceleration when the line voltage is between 850 and 750. There is no practical way to establish the performance of the cars in the BART system so the District contract with AEG Westinghouse to perform these tests.

DISTRICT ROOF REPLACEMENT (17AC)

PROJECT DESCRIPTION:

This is a five year, five phase project to replace approximately 50% of the roofing throughout the District.

PROJECT JUSTIFICATION:

Many of the roofs of the District's buildings are in very poor condition due to age and a have a variety of problems. The five year plan prioritizes those roofs with the most severe leakage. Maintenance engineering, with the support of a roof consultant, has developed the program.

IBB FIBER OPTIC CONNECTION

PROJECT DESCRIPTION:

The purpose of this project is to install a communication link between the First Interstate Building, Lake Merritt Administration and the Metro Center Building.

PROJECT JUSTIFICATION:

This project is required to enable data communications between the computer networks in all three buildings.

ADD VEHICLE ACCESS - ASHBY

PROJECT DESCRIPTION:

The purpose of this project is the installation of one additional vehicle access point Ashby Portal, Richmond Line.

PROJECT JUSTIFICATION:

Maintenance access point #8 in Berkeley cannot be used by maintenance crews after 2000 hours due to noise complaints by residents. Setting equipment on at access pint #16 increases run time with equipment by 30 minutes, losing productive track time. Installation of an additional access pint at Ashby Portal will allow unrestricted set-ons at any time. This will increase track time productivity.

MARIS RENEWAL

PROJECT DESCRIPTION:

The effect of this project will revitalize existing application software and will enable Information Systems to protect BART's software investment.

PROJECT JUSTIFICATION:

The District has invested over two million dollars in computer systems over the past eleven years. In order to protect and leverage BART's investment, it is necessary to redevelop these internally programmed systems by employing current technology so that these systems will carry BART through the 1990's. To accomplish this, Information Systems needs to reestablish the position of Data Base Administrator that was abolished 18 months ago and add another programmer. This additional capability is required to integrate growth for the service extension program into the existing MARIS system.

TRAIN OPERATOR REPORT FACILITY - FREMONT (01RM)

PROJECT DESCRIPTION:

This project will expand train operators reporting facilities.

PROJECT JUSTIFICATION:

The transportation facilities are overcrowded. With increase of staff required to maintain service and yard, expansion is required t provide for adequate ready room/restroom and locker capacity for train operations.

END-USER COMPUTING

PROJECT DESCRIPTION:

This ongoing program supplies personal computer hardware and software support for the District.

PROJECT JUSTIFICATION:

This program has been in operation for over four years and has delivered service and support to the majority of District work groups. The program is moving into the more complex area of local area networking and requires continued, cohesive and reliable program support.

NEW AUTOMATIC VEHICLE IDENTIFICATION SYSTEM

PROJECT DESCRIPTION:

This project will replace existing automatic car identification (ACI) system with a new system.

PROJECT JUSTIFICATION:

This project will improve the car inventory and car location reporting system.

TRAIN OPERATOR REPORT FACILITY - CONCORD STATION (03PH)

PROJECT DESCRIPTION:

The purpose of this project is to construct train operator report facility at Concord Station.

PROJECT JUSTIFICATION:

The labor agreement with ATU 1555 allows for multiple report locations for train operators provided that adequate reporting facilities are made available. Train operations has determined that savings in operational cost can be realized by relocating the primary report facility to Concord Station from Concord Yard.

FIRE REMOTE TEST PANEL

PROJECT DESCRIPTION:

This project will provide remote testing and annunciation (from the toll test board) of each individual fire radio base station.

PROJECT JUSTIFICATION:

Currently, when a fire radio base station fails, the failure is not communicated (contrary to District standard practice for other systems). Central is unaware of the failure until the next bi-weekly test sequence or until someone attempts to use the system. Implementation of remote testing and annunciation will eliminate the existing by-weekly testing which is labor intensive and assures fire radio system availability in an emergency.

ADD ESCALATOR SAFETY PLATE

PROJECT DESCRIPTION:

This project will install escalator stip side plates on each step of District escalators t eliminate gap between step and skirt. This reduces accident hazard.

PROJECT JUSTIFICATION:

The present gap on the side of the escalator steps is a potential hazard for trapping shoes, fingers or clothing, especially children's clothing.

INSTALL LIGHT-SENSITIVE ELEVATOR DOOR SENSORS

PROJECT DESCRIPTION:

The purpose of this project is to install elevator door sensors in station elevators.

PROJECT JUSTIFICATION:

The installation of the elevator door sensors will eliminate early door closure and reduce the risk for customer accidents. This project particularly benefits the elderly, disabled and small children.

REPLACE ESCALATORS - EMBARCADERO STATION

PROJECT DESCRIPTION:

This project will replace the modular escalators at Embarcadero with conventional units.

PROJECT JUSTIFICATION:

Modular units have a higher failure rate and cost more to repair in time and material cost than conventional units.

MACARTHUR STATION TILE REPLACEMENT

PROJECT DESCRIPTION:

The purpose of this project is to replace tilework at MacArthur Station.

PROJECT JUSTIFICATION:

Tile throughout the station has been damaged or is missing and requires replacement.

VENTILATION STUDY - OAKLAND WYE

PROJECT DESCRIPTION:

The purpose of this study is to conduct a computer simulation of train in an emergency situation in various tunnel sections of the Oakland Wye.

PROJECT JUSTIFICATION:

Numerous computer simulation studies have been performed on incident trains in the Oakland Wye but none of these studies adequately examined the scenario of an incident train partially blocking a throat i the Oakland Wye. The study will examine all scenarios with emphasis on worst case events by involving varying train lengths.

D. CAPACITY EXPANSION

DALY CITY TURNBACK, YARD AND SHOP (11-,11TD)

PROJECT DESCRIPTION:

This project is to construct a turnback, yard and shop at Daly City to allow quicker train reversing south of the station and additional train/car storage. Another part of this project involves reconfiguring the M87 interlocking in the vicinity of Daly City.

PROJECT JUSTIFICATION:

Higher density train operations will require a more efficient and less time-consuming train reversing capability at Daly City. An interim measure already completed permits the reduction of the minimum scheduled headway to 3 minutes, 30 seconds through train control modifications in the vicinity of Daly City Station.

A West Bay storage facility will be needed to lay up vehicles not needed for midday operations. Layups at this yard will produce significant savings in power and vehicle maintenance costs. Shop facilities will provide essential support to the new yard and in maintaining lower headways. (The Shop Facilities project is a separate project at a cost of $7.9 million.)

As presently configured, the M-87 interlocking (which provides safe routing of trains in the vicinity of Daly City Station where the tracks cross over each other) creates interference between inbound and outbound trains. Reconfiguring the M-87 interlocking will increase operational flexibility in the vicinity of the Daly City Turnback.

ELECTRICAL CAPACITY INCREASE (15EG)

PROJECT DESCRIPTION:

The purpose of this project is to increase power distribution on the C-line and in all three East Bay yards.

PROJECT JUSTIFICATION:

Operation of additional peak period trains at reduced headways will require additional power distribution facilities on the C-line and in all three East Bay yards. Improvements include the installation of 2 new substations, modification and upgrade of existing yard substations, modification of the third rail and increase of yard feeder cable capacity.

WAYSIDE TRAIN CONTROL/SYSTEM PERFORMANCE MODIFICATIONS (20EE)

PROJECT DESCRIPTION:

This project is to implement Wayside Train Control improvements and System Performance Modifications as described below.

PROJECT JUSTIFICATION:

The System Performance Study determined that a number of improvements will be necessary to achieve BART's capacity expansion objectives while maintaining or enhancing service quality. The improvements necessary include the following key tasks:

- Reconfiguration of track circuits by moving and adding blocks to minimize headways and to match Sequential Occupancy Release System (SORS) requirements
- Resignalling of some parts of the system (mostly in San Francisco)
- Improving station approaches
- Modification of SORS software to reduce the time to initialize (reset) the system and to match track modifications
- Optimization of speed codes systemwide
- Development and implementation of a delay reduction program
- Development of the simulator to include the delay model
- Modification of the Brake Rate Algorithm

YARD IMPROVEMENTS (2-BB)

PROJECT DESCRIPTION:

This project is to install wiring, circuits and equipment (including car detection) to support yard control improvements at Concord, Richmond and Hayward train yards.

PROJECT JUSTIFICATION:

Some storage tracks at Concord and Hayward yards do not have operational train control capability. Installation of appropriate train control components will improve overall operational efficiency in both yards.
Modifications at the Richmond yard are required in order to optimize the operational benefits of the new C-cars.

NEW ON-BOARD ATC (41GB)

PROJECT DESCRIPTION:

This project will replace existing Automatic Train Control (ATC) units on all A-cars with the new units that have recently been designed for the C-cars.

PROJECT JUSTIFICATION:

The existing ATC units on A-cars represent the largest single cause of vehicle service disrupting failures on the system. The New On-Board ATC will substantially reduce ATC hardware failures and, through the use of redundancy, will reduce ATC-caused service disrupting failures by a factor of 25 to 1. These units are being installed in all new C-cars and are being retrofit into existing A-cars.

C-CARS (42–)

PROJECT DESCRIPTION:

The purpose of this project is to procure 150 additional revenue transit vehicles that are designed to operate in any position on a train. These new cars are designated as C-cars.

PROJECT JUSTIFICATION:

One hundred fifty new revenue vehicles are needed to service anticipated patronage growth. The new C-cars will permit expansion of existing trains to the maximum length of 10 cars long, addition of new trains on the system (after headways are reduced), and efficient on-line sizing of trains. These cars can be placed at the head of a train (like an A-car) or in the middle of a train (like a B-car).

CENTRAL CONTROL DISPLAY BOARD MODIFICATIONS (60GL)

PROJECT DESCRIPTION:

The purpose of this project is to install a modified central control display board.

PROJECT JUSTIFICATION:

With the completion and implementation of the Daly City Turnback and Yard, the existing central control display is obsolete. The new display board will show the Daly City Turnback and Yard and enhance operational capability of central control staff.

UPDATE TO CCS (62AB)

PROJECT DESCRIPTION:

The purpose of this project is to provide operational enhancements to CCS.

PROJECT JUSTIFICATION:

It has been the District's experience with the P250 that substantial enhancements are necessary to endure effective control of the system by CCS. It is anticipated that upon completion of dual operations with CCS substantial enhancements would be necessary.

CENTRAL CONTROL SYSTEM (61–)

PROJECT DESCRIPTION:

This project will provide hardware and software to replace the aging Central Control system (P250).

PROJECT JUSTIFICATION:

The P250 cannot sustain operations of trains beyond 55. It is difficult to maintain the P250 system due to its obsolescence. The CCS project will replace the P250 hardware and software and will be utilizes to control system operation.

TIME LOCKING MODIFICATIONS (20BF)

PROJECT DESCRIPTION:

This modification will replace current mechanical time locking relays with newer more reliable solid state relays. The newer relays would allow a change i the manner that the time locking function is invoked resulting in decreased delay for trains during busy periods.

PROJECT JUSTIFICATION:

This modification is necessary to allow closer headway operation under the Capacity Expansion Program.

EXTENSION SERVICE PLAN (ESP)

PROJECT DESCRIPTION:

The Extension Service Plan is a project which will determine BART's future capital and operational needs when the Phase I Extension Program is implemented.

PROJECT JUSTIFICATION:

A general engineering study must ge conducted which addressed the key findings and study areas identified in the Extension Service Plan recently completed by BART staff. This general engineering study must develop an assessment of needs, timelines and estimates of capital costs. The strategy of a comprehensive study establishes a coordinated approach for determining future support facility requirements and will allow BART to meet the service needs of our patrons.

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F. TEN-YEAR CAPITAL PROGRAM CASH FLOWS

5 Year Capital Projects Summary
All Projects
Final Draft 1990 CIP

		Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
ACCESS										
01EE 492-Sp Pkg Facility-LMS(III)										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	0	0	8942	0	8942
	Totals:	0	0	0	0	0	0	8942	0	8942
01GG 100-Sp Alameda Prk/Rd-FVS (III)										
	Funded:	0	0	0	0	0	0	429	0	429
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	0	0	0	0	0	0	429	0	429
01GH 859-Sp Fringe Pkg Facility FVS										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	1147	10687	2616	0	0	0	14450
	Totals:	0	0	1147	10687	2616	0	0	0	14450
01J- San Leandro Bus Intermodal										
	Funded:	0	350	1000	0	0	0	0	0	1350
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	0	350	1000	0	0	0	0	0	1350
01MH 844-Sp Fringe Pkg Facility BFS										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	0	0	14904	0	14904
	Totals:	0	0	0	0	0	0	14904	0	14904
01OG HAYWARD ACCESS IMPROVEMENTS										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	5552	7015	0	0	0	0	12567
	Totals:	0	0	5552	7015	0	0	0	0	12567
03EB Rockridge Access Improvement										
	Funded:	0	100	0	0	0	0	0	0	100
	Unfunded:	0	0	6946	0	0	0	0	0	6946
	Totals:	0	100	6946	0	0	0	0	0	7046
03HG 500-Sp Fringe Parking Facility-OR										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	0	0	12441	0	12441
	Totals:	0	0	0	0	0	0	12441	0	12441
03JG 872-Sp Fringe Pkg Facility LAS (I)										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	0	0	14690	0	14690
	Totals:	0	0	0	0	0	0	14690	0	14690
03LG 1265-Sp Fringe Pkg Facility-WCS (I)										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	20509	0	0	0	20509
	Totals:	0	0	0	0	20509	0	0	0	20509
03NE 1200-SP.PKG FACIL(EXP-PHI)-PHS										
	Funded:	5894	10266	0	0	0	0	0	0	16160
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	5894	10266	0	0	0	0	0	0	16160
03NG 1200-Sp Replacement Parking-PHS (I)										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	25462	0	0	0	25462
	Totals:	0	0	0	0	25462	0	0	0	25462

	Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
03SN 1385 - SP Fringe Pkg Facl-CDS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	0	19040	0	19040
Totals:	0	0	0	0	0	0	19040	0	19040
04IA Park/Ride Lot Railroad Ave-PTS									
Funded:	0	0	0	0	188	0	0	0	188
Unfunded:	0	0	0	0	627	0	0	0	627
Totals:	0	0	0	0	815	0	0	0	815
04K- Bus Access Renovation - CNS									
Funded:	0	100	1350	25	0	0	0	0	1475
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	100	1350	25	0	0	0	0	1475
04KA PARK RIDE LOT-SOMERSVILLE ROAD-WAS									
Funded:	0	1262	0	0	0	0	0	0	1262
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	1262	0	0	0	0	0	0	1262
04RA Brentwood Park/Ride									
Funded:	0	0	0	0	58	0	0	0	58
Unfunded:	0	0	0	0	301	0	0	0	301
Totals:	0	0	0	0	359	0	0	0	359
05KH 1200-Sp Fringe Pkg Facility-CNS									
Funded:	7400	3238	0	162	0	0	0	0	10800
Unfunded:	0	0	0	718	0	0	0	0	718
Totals:	7400	3238	0	880	0	0	0	0	11518
06KA 500-Sp Park/Ride Lot/I&II HRS(XR)									
Funded:	10	0	0	0	0	0	0	0	10
Unfunded:	0	0	0	0	0	0	871	0	871
Totals:	10	0	0	0	0	0	871	0	881
07GH 912-Sp Fringe Parking Facility-MAS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	0	16739	0	16739
Totals:	0	0	0	0	0	0	16739	0	16739
08KA West Livermore Park/Ride									
Funded:	0	437	0	0	0	0	0	0	437
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	437	0	0	0	0	0	0	437
11EG West Oakland Parking-Land Acqusition									
Funded:	0	10561	0	0	0	0	0	0	10561
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	10561	0	0	0	0	0	0	10561
11EH West Oakland Station Parking Facility									
Funded:	0	0	0	0	0	0	11943	0	11943
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	0	0	0	0	0	11943	0	11943
11U- Daly City Intermodal Facility									
Funded:	25	202	0	0	0	0	0	0	227
Unfunded:	0	387	7571	0	0	0	0	0	7958
Totals:	25	589	7571	0	0	0	0	0	8185

		Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
8BXX El Cerrito Plaza Parking Facility										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	0	0	0	12409	12409
	Totals:	0	0	0	0	0	0	0	12409	12409
FUNDED SUBTOTALS		13329	26516	2350	187	246	0	12372	0	55000
UNFUNDED SUBTOTALS		0	387	21216	18420	49515	0	87627	12409	189574
BASIC SYSTEM										
01RM Train Operator Report Facility FMS										
	Funded:	0	240	0	0	0	0	0	0	240
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	0	240	0	0	0	0	0	0	240
01S— Renew & Upgrade Pvmnt/Lighting - OHY										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	272	0	0	0	0	0	0	272
	Totals:	0	272	0	0	0	0	0	0	272
01SR WOMEN'S RESTROOM/LOCKR & SHOWER-OHY										
	Funded:	0	88	0	0	0	0	0	0	88
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	0	88	0	0	0	0	0	0	88
01V- FREMONT/UNION CITY ROADWAY REPAVING										
	Funded:	0	191	0	0	0	0	0	0	191
	Unfunded:	0	255	0	0	0	0	0	0	255
	Totals:	0	446	0	0	0	0	0	0	446
03FM WET STANDPIPES SYS/SO BORE BHT										
	Funded:	45	288	1000	912	0	0	0	0	2245
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	45	288	1000	912	0	0	0	0	2245
03ID REPLACE STATION TILES-LAS										
	Funded:	0	21	0	0	0	0	0	0	21
	Unfunded:	0	201	0	0	0	0	0	0	201
	Totals:	0	222	0	0	0	0	0	0	222
03PH TO Report Facility CNS										
	Funded:	0	240	0	0	0	0	0	0	240
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	0	240	0	0	0	0	0	0	240
05—A Add Maintenance of Way Access - Ashby										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	0	0	81	0	81
	Totals:	0	0	0	0	0	0	81	0	81
05NF Expand Transportation Bldg-RIY										
	Funded:	38	260	0	0	0	0	0	0	298
	Unfunded:	0	35	0	0	0	0	0	0	35
	Totals:	38	295	0	0	0	0	0	0	333
07—A Tile Replacement - MAS										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	0	0	110	0	110
	Totals:	0	0	0	0	0	0	110	0	110

	Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
07BC CalTrans Seismic Freeway									
Funded:	0	1000	0	0	0	0	0	0	1000
Unfunded:	0	0	1168	0	0	0	0	0	1168
Totals:	0	1000	1168	0	0	0	0	0	2168
11DB SECOND PLATFORM STAIRWAY-WOS									
Funded:	589	541	0	0	0	0	0	0	1130
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	589	541	0	0	0	0	0	0	1130
11FG SECOND PLATFORM/MEZZ. STAIRWAY-EMS									
Funded:	692	623	0	0	0	0	0	0	1315
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	692	623	0	0	0	0	0	0	1315
15—A New Automatic Vehicle ID System									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	0	2600	0	2600
Totals:	0	0	0	0	0	0	2600	0	2600
15—B Add Escalotor Safety Plate									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	0	700	0	700
Totals:	0	0	0	0	0	0	700	0	700
15—C Install Light Sensitive Elevator Door Se									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	0	77	0	77
Totals:	0	0	0	0	0	0	77	0	77
15—D Replace Escalators - EMS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	0	2000	0	2000
Totals:	0	0	0	0	0	0	2000	0	2000
15—E EQ Standby Power									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	1200	0	0	0	0	0	1200
Totals:	0	0	1200	0	0	0	0	0	1200
15AZ WET STANDPIPES & FD CONNS-21 STNS									
Funded:	1170	1684	697	0	0	0	0	0	3551
Unfunded:	0	0	100	0	0	0	0	0	100
Totals:	1170	1684	797	0	0	0	0	0	3651
15BH DRY STANDPIPES (56) SUBWAY									
Funded:	503	1000	4000	3707	0	0	0	0	9210
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	503	1000	4000	3707	0	0	0	0	9210
15RB Sta. Entranc Canopys-SF/OAK/BK									
Funded:	27	430	0	0	0	0	0	0	457
Unfunded:	0	0	8030	0	0	0	0	0	8030
Totals:	27	430	8030	0	0	0	0	0	8487
17AC District Roof Replacement									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	2434	0	0	0	0	0	2434
Totals:	0	0	2434	0	0	0	0	0	2434

5 Year Capital Projects Summary
All Projects
Final Draft 1990 CIP

	Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
20AC Eliminate Station Interfaces									
Funded:	2263	127	0	0	0	0	0	0	2390
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	2263	127	0	0	0	0	0	0	2390
20HB Additional Station Essential Power									
Funded:	100	1000	866	0	0	0	0	0	1966
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	100	1000	866	0	0	0	0	0	1966
27--A IBB Fiber Optic Connection									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	0	147	0	147
Totals:	0	0	0	0	0	0	147	0	147
27--B Firephone Remote Test Pannel									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	0	82	0	82
Totals:	0	0	0	0	0	0	82	0	82
270C RADCOM Mods-Central Control/Phase B									
Funded:	1180	570	0	0	0	0	0	0	1750
Unfunded:	0	216	0	0	0	0	0	0	216
Totals:	1180	786	0	0	0	0	0	0	1966
41BV 750/85 Volt System Perf Tests									
Funded:	0	500	0	0	0	0	0	0	500
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	500	0	0	0	0	0	0	500
41FB REPLACE VEHICLE SIDE DOORS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	3833	0	0	0	0	0	3833
Totals:	0	0	3833	0	0	0	0	0	3833
44-- Regional Multi-operator pass									
Funded:	501	4868	0	0	0	0	0	0	5369
Unfunded:	0	395	461	0	0	0	0	0	856
Totals:	501	5263	461	0	0	0	0	0	6225
45AN Multi-Denominaltional Bill Validators									
Funded:	0	198	0	0	0	0	0	0	198
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	198	0	0	0	0	0	0	198
45BF IBM TICKET TRANSPORT RETROFIT									
Funded:	1203	97	0	0	0	0	0	0	1300
Unfunded:	0	375	0	0	0	0	0	0	375
Totals:	1203	472	0	0	0	0	0	0	1675
47BA 9 Vendors & 8 Addfares/Misc									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	130	1190	0	0	0	0	0	1320
Totals:	0	130	1190	0	0	0	0	0	1320
47CA Replace AC & MUNI Transfer Machines									
Funded:	0	483	0	0	0	0	0	0	483
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	483	0	0	0	0	0	0	483

		Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
64—A Replace MIS Computer										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	5575	0	0	0	0	0	5575
	Totals:	0	0	5575	0	0	0	0	0	5575
64—B Maris Renewal ,										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	742	0	0	0	0	0	742
	Totals:	0	0	742	0	0	0	0	0	742
65ED PB&R INFO PROCESS NET										
	Funded:	254	25	0	0	0	0	0	0	279
	Unfunded:	0	80	0	0	0	0	0	0	80
	Totals:	254	105	0	0	0	0	0	0	359
65HC E & C PROJECT MGT SYS - PH II										
	Funded:	140	185	0	0	0	0	0	0	325
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	140	185	0	0	0	0	0	0	325
65HE E & C Project Tracking- PH IV										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	850	226	0	0	0	0	0	1076
	Totals:	0	850	226	0	0	0	0	0	1076
68DE 4 Tractor/Trailer Armored Trucks										
	Funded:	186	263	0	0	0	0	0	0	449
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	186	263	0	0	0	0	0	0	449
79KB TRAIN OPERATOR MEGAPHONES										
	Funded:	0	0	43	0	0	0	0	0	43
	Unfunded:	0	0	44	0	0	0	0	0	44
	Totals:	0	0	87	0	0	0	0	0	87
79NC Replace 12 Yard Elect Carts										
	Funded:	111	120	0	0	0	0	0	0	231
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	111	120	0	0	0	0	0	0	231
91—A Ventilation Study - Oakland Wye										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	0	0	0	0	50	0	50
	Totals:	0	0	0	0	0	0	50	0	50
91AH Replace Destination Sign Computer - Stud										
	Funded:	0	100	0	0	0	0	0	0	100
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	0	100	0	0	0	0	0	0	100
94— FEMA 10/17/89 EQ Repairs										
	Funded:	0	1889	475	0	0	0	0	0	2364
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	0	1889	475	0	0	0	0	0	2364
94—A FEMA Asbestos Removal (Low/Medium Priori										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	4886	0	0	0	0	0	4886
	Totals:	0	0	4886	0	0	0	0	0	4886

	Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
99*01 Capital Planning Projects									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	3922	0	0	0	0	0	0	3922
Totals:	0	3922	0	0	0	0	0	0	3922
99*02 Indirect Planning Support									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	1436	0	0	0	0	0	0	1436
Totals:	0	1436	0	0	0	0	0	0	1436
99*03 FY91 Capital Projects Under 100K									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	2500	0	0	0	0	0	0	2500
Totals:	0	2500	0	0	0	0	0	0	2500
AXXX Public Safety Peplacement Project									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	1865	0	0	0	1865
Totals:	0	0	0	0	1865	0	0	0	1865
BXXX REPLACE MAINTENANCE VEHICLES & EQUIPMENT									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	4574	0	0	4574
Totals:	0	0	0	0	0	4574	0	0	4574
CXXX RAIL REPLACEMENT									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	3716	0	0	0	3716
Totals:	0	0	0	0	3716	0	0	0	3716
DDXX REPLACE CASH HANDLING EQUIPMENT									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	1134	0	0	1134
Totals:	0	0	0	0	0	1134	0	0	1134
DXXX REHABILITATE TRANSIT VEHICLES (A&B CARS)									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	335930	0	0	0	335930
Totals:	0	0	0	0	335930	0	0	0	335930
EEXX PUBLIC SAFETY ENHANCEMENT PROJECTS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	14030	0	0	14030
Totals:	0	0	0	0	0	14030	0	0	14030
EXXX SHOP & YARD ENHANCEMENTS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	9366	0	0	9366
Totals:	0	0	0	0	0	9366	0	0	9366
FFXX REPLACE & REHAB MAINT SHOPS & REPLACE HE									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	15428	0	0	15428
Totals:	0	0	0	0	0	15428	0	0	15428
FXXX REPLACE ELECTRICAL CORROSION CONTROLS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	5535	0	0	5535
Totals:	0	0	0	0	0	5535	0	0	5535

	Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
GGXX EQ Preparedness									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	8605	0	0	8605
Totals:	0	0	0	0	0	8605	0	0	8605
GXXX STATION REPLACEMENT AND REHABILITATION									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	10257	0	0	10257
Totals:	0	0	0	0	0	10257	0	0	10257
HHHX Elderly & Handicapped Projects									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	1101	0	0	1101
Totals:	0	0	0	0	0	1101	0	0	1101
HHXX ENHANCE TRAIN RADIO SYSTEM COVERAGE									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	2614	0	0	2614
Totals:	0	0	0	0	0	2614	0	0	2614
HXXX AUTOMATED DOCUMENTATION, CAD & CONFIG. C									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	14283	0	0	14283
Totals:	0	0	0	0	0	14283	0	0	14283
IXXX PASSENGER INFORMATION SYSTEMS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	10138	0	0	10138
Totals:	0	0	0	0	0	10138	0	0	10138
JJXX REPLACE AUTOMATIC FARE COLLECTION EQUIPM									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	15552	0	0	15552
Totals:	0	0	0	0	0	15552	0	0	15552
JXXX SYSTEMWIDE REPLACEMENT PROJECTS									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	20645	0	0	20645
Totals:	0	0	0	0	0	20645	0	0	20645
KXXX Systemwide Enhancement Projects									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	0	4688	0	2295	6983
Totals:	0	0	0	0	0	4688	0	2295	6983
LXXX New C2 Car - Basic System									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	71	446	6022	9449	22428	0	0	0	38416
Totals:	71	446	6022	9449	22428	0	0	0	38416
NXXX End User Computing									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	414	0	0	0	414
Totals:	0	0	0	0	414	0	0	0	414
QXXX CASH HANDLING EXPANSION									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	0	0	0	1486	0	0	0	1486
Totals:	0	0	0	0	1486	0	0	0	1486
FUNDED SUBTOTALS	9002	17031	7081	4619	0	0	0	0	37733
UNFUNDED SUBTOTALS	71	11113	35911	9449	365839	137950	5847	2295	568475

		Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
——CAPACITY EXPANSION——										
11— Daly City Turnback & Yard										
	Funded:	149019	6295	0	0	0	0	0	0	155314
	Unfunded:	0	1095	0	0	0	0	0	0	1095
	Totals:	149019	7390	0	0	0	0	0	0	156409
15EG Electrical Capacity Improvements										
	Funded:	7835	811	0	0	0	0	0	0	8646
	Unfunded:	0	2100	0	0	0	0	0	0	2100
	Totals:	7835	2911	0	0	0	0	0	0	10746
2-88 Add'l STC-Storage TRKS/1Z4498-H										
	Funded:	0	1170	0	0	0	0	0	0	1170
	Unfunded:	0	997	0	0	0	0	0	0	997
	Totals:	0	2167	0	0	0	0	0	0	2167
20BF Timelocking Mods										
	Funded:	0	344	0	0	0	0	0	0	344
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	0	344	0	0	0	0	0	0	344
20EE Wayside TC & System Perfor MODS										
	Funded:	5443	6666	1459	0	1361	0	0	0	14929
	Unfunded:	0	0	0	0	2928	0	0	0	2928
	Totals:	5443	6666	1459	0	4289	0	0	0	17857
41GB 2nd Generation ATO/138 A-Car Sets										
	Funded:	15301	0	131	0	0	0	0	0	15432
	Unfunded:	0	878	0	0	0	0	0	0	878
	Totals:	15301	878	131	0	0	0	0	0	16310
42— 150 2nd Gen Trans Veh W/PRO ATC										
	Funded:	211964	9870	4769	0	0	0	0	0	226603
	Unfunded:	0	0	0	0	0	0	0	0	0
	Totals:	211964	9870	4769	0	0	0	0	0	226603
60GL DISPLAY BOARD MODS										
	Funded:	0	1516	0	0	0	0	0	0	1516
	Unfunded:	0	330	0	0	0	0	0	0	330
	Totals:	0	1846	0	0	0	0	0	0	1846
61— Central Control System										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	2765	0	0	0	0	0	2765
	Totals:	0	0	2765	0	0	0	0	0	2765
62AB Update to CCS										
	Funded:	0	0	0	0	0	0	0	0	0
	Unfunded:	0	0	500	0	0	0	0	0	500
	Totals:	0	0	500	0	0	0	0	0	500
FUNDED SUBTOTALS		389562	26672	6359	0	1361	0	0	0	423954
UNFUNDED SUBTOTALS		0	5400	3265	0	2928	0	0	0	11593
——EXTENSIONS——										
0-B-& Extensions R.O.W. Acquisition										
	Funded:	36477	0	0	0	0	0	0	0	36477
	Unfunded:	11115	19782	0	0	4825	13702	0	0	49424
	Totals:	47592	19782	0	0	4825	13702	0	0	85901

5 Year Capital Projects Summary
All Projects
Final Draft 1990 CIP

	Prior	1991	1992	1993	1994	1995	Within 5 Years	Remaining Years	Total
02— Irvington/Warm Springs WSX									
Funded:	22867	0	0	0	0	0	0	107074	129941
Unfunded:	2225	3679	808	4729	0	0	0	384044	395485
Totals:	25092	3679	808	4729	0	0	0	491118	525426
04— Pittsburg/Antioch Extension									
Funded:	4830	10639	1126	36067	3643	7139	0	40076	103520
Unfunded:	3903	53287	88067	52905	56727	38388	0	25769	319046
Totals:	8733	63926	89193	88972	60370	45527	0	65845	422566
08— Dublin/Pleasanton Extension									
Funded:	18715	6280	0	56520	27000	10730	0	57214	176459
Unfunded:	4373	48664	32499	87774	62514	105376	0	42341	383541
Totals:	23088	54944	32499	144294	89514	116106	0	99555	560000
11AQ SF MUNI EXTENSION PROJECT									
Funded:	0	1000	9000	5000	0	0	0	0	15000
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	0	1000	9000	5000	0	0	0	0	15000
12— SAN FRANCISCO AIRPORT EXTENSION									
Funded:	0	0	0	0	0	0	0	0	0
Unfunded:	0	1158	4971	21914	44330	89544	0	598489	760406
Totals:	0	1158	4971	21914	44330	89544	0	598489	760406
12D- COLMA STATION EXTENSION									
Funded:	2557	2892	2607	4214	4253	2434	0	361	19318
Unfunded:	0	2607	16658	29511	29765	17040	0	2520	98101
Totals:	2557	5499	19265	33725	34018	19474	0	2881	117419
65HD E & C PROJECT MGT NETWORK SYS-PH III									
Funded:	244	43	0	0	0	0	0	0	287
Unfunded:	0	0	0	0	0	0	0	0	0
Totals:	244	43	0	0	0	0	0	0	287
FUNDED SUBTOTALS	85690	20854	12733	101801	34896	20303	0	204725	481002
UNFUNDED SUBTOTALS	21616	129177	143003	196833	198161	264050	0	1053163	2006003
FUNDED TOTALS	497583	91073	28523	106607	36503	20303	12372	204725	997689
UNFUNDED TOTALS	21687	146077	203395	224702	616443	402000	93474	1067867	2775645
GRAND TOTALS	519270	237150	231918	331309	652946	422303	105846	1272592	3773334

End of Report.

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1992-2002

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

CAPITAL IMPROVEMENT PROGRAM
FOR
FISCAL YEARS 1992-2002

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SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

CAPITAL IMPROVEMENT PLAN

FISCAL YEARS 1992 - 2002

The preparation of this report has been financed in part through a grant from the United States Department of Transportation, Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, as amended, as passed through the Metropolitan Transportation Commission. This report has been prepared in conformance with MTC guidelines for Short-Range Transit Plans as revised in March 1990, with specific reference to interim updates.

The contents of this report reflect the views of BART, which is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the original views or policy of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

All projects discussed are subject to state and federal environmental review as required by law. Specific projects and project funding are subject to approval by BART's Board of Directors. Projects that do not yet satisfy these requirements are proposed projects.

August 1, 1991

IMPORTANT NOTICE

This document is a **DRAFT** of the Bay Area Rapid Transit District's FY1992-2002 Capital Improvement Program. This draft document has not been approved by the BART Board of Directors, and is intended for public review and comment only.

Questions and comments regarding this document should be addressed to :

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Following receipt of public comment, and after further development by BART staff, a final document will be prepared and presented to the Board of Directors for its consideration.

All of the information contained in this draft document is subject to change in preparation of the final document. There is no prioritization of projects expressed or implied in this draft document.

This Capital Improvement Program document is the companion volume to the Short Range Transit Plan, or Operating Plan, which sets forth the levels of service which the Capital Program is intended to support. The draft Operating Plan is available from the BART Planning Department.

CAPITAL IMPROVEMENT PLAN

FISCAL YEARS 1992 - 2002

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INTRODUCTION

This document presents BART's Capital Improvement Program for the period fiscal year 1992 (beginning July 1, 1991) through 2002. It represents BART's current comprehensive vision of the major capital improvements which will need to be implemented during this period in order to:

1. operate the BART system in a manner that is safe and secure for patrons and employees alike, by continuing to maintain and improve safety systems;
2. continue to provide high-quality, reliable transit services by means of rehabilitating aging components of the system before their failure can cause disruption of service;
3. improve and enhance the level of service provided;
4. improve operating efficiency/productivity; and
5. extend the rail transit system into areas not yet directly served.

ORGANIZATION OF THE DOCUMENT

The five narrative chapters that follow are organized along the lines of supporting each of the categories of service presented above. Each chapter includes a listing of all of the major projects currently considered necessary to achieve these goals over the next decade.

CONTEXT OF THE PROGRAM

BART faces two enormous challenges as it prepares to enter the 21st Century with this Capital Improvement Program. The District is committed to building a multi-billion dollar program of rail system extensions into areas not yet directly served, while at the same time undertaking an unprecedented program of rehabilitating and upgrading the existing system.

AN AGING SYSTEM

BART is no longer a sparkling new system. The onset of aging makes it essential for BART to begin rebuilding before it experiences the declining spiral of effects that many older rail transit systems have experienced due to their inability to attend to preventative maintenance and rehabilitation in a timely manner. This his not glamorous, high-visibility work, and it can be very expensive. But it is essential, and in the long run, it is much more cost effective to rehabilitate systems before reaching the point of failure than to try to fix the problems after they become readily apparent. This will also avoid future degradation of service and consequent loss of patronage and fare revenue. BART must not only maintain its current level of service, but also provide even more service to meet the needs of a growing market. It is in that context that much of this program of proposed projects has been developed.

BART passenger service began in September 1972 on the Fremont to Oakland segment. Service was extended to Richmond five months later, and to Concord four months after that. Daly City to San Francisco service began in November 1973, and the full system was operational with the opening of Transbay Tube revenue service in September 1974.

Most of the hardware and facilities that comprise the BART rail system are now approaching, or are already over, 20 years old. Much of the transit equipment is nearing the end of the operational lifetime for which it was designed, and many facilities are in need of significant updating. For example:

* the typical BART transit vehicle has accumulated almost a million miles of travel;

* the typical vehicle has cycled its doors almost three million times;

* almost a billion people have been transported in these vehicles, used the farecard vendors, actuated the faregates, and ridden station escalators or walked the stairs;

* the train control electronics that were state-of-the-art 20 years ago are now obsolete.

This Capital Improvement Program reflects this situation in identifying a major rehabilitation program for the transit vehicles, the train control system, the stations, the maintenance facilities, and many other parts of the vast physical plant that is BART.

A GROWING SYSTEM

BART patronage has grown dramatically in the last decade, about 80 percent growth from a little under 140,000 trips on an average weekday in 1980 to over 250,000 daily in 1990. The focus of BART's capital program during that time was on adding capacity to carry more and more riders. A $500 million Capacity Expansion Program added 150 new transit vehicles, a third track through downtown Oakland to handle more trains, a turnback facility at Daly City Station to speed the reversal of trains at that end of the line, a West Bay vehicle storage yard to allow trains to begin eastbound service from Daly City without first traveling empty from the East Bay predawn, and a variety of improvements to allow trains to run closer together.

Patronage is expected to continue growing in the future, and this will require additional facilities. Access to BART stations has long been a constraint at many stations. This current capital program proposes almost $200 million in expenditures to increase significantly both patron parking and capacity to handle more buses, along with more comfortable amenities for patrons who will be riding buses to the stations. More farecard vendors and faregates are proposed, along with improvements in the system of fare collection and integration with other transit operators. The system extensions will bring more transit vehicles into service, which will also help carry more passengers on the existing rail network.

AN EXPANDING SYSTEM

For much of the last ten years, BART has been involved in detailed planning of extensions to the system, and in efforts to secure funding for building them. The planning is now, or soon will be, essentially complete for several of these extensions, and major portions of the required funding are in place. This current capital program envisions completion of extensions to Dublin-Pleasanton, Warm Springs, West Pittsburg, Colma and then San Francisco Airport by the year 2002, although substantial amounts of funding must yet to be secured in order to accomplish this.

SMALL PROJECTS

This Capital Improvement Program includes all currently anticipated "major" projects. In addition to such large projects, BART typically undertakes a number of smaller capital projects each year. These are defined as projects which will cost less than $100,000 to implement. Examples of such projects include relatively small facility improvements, studies to define large capital project specifications, one of a kind equipment purchases, and so on. Each year BART sets aside an allocation of District funds to cover such projects. Since these projects are generally implemented within the same year as the need is identified, they do not appear in the formal Capital Improvement Program.

SAFETY AND SECURITY PROJECTS

SEISMIC SAFETY PROJECTS

1. SYSTEMWIDE STRUCTURAL INSPECTION

Project description:
Field inspect all structures that carry transit vehicles. Findings and recommendations would then be compiled in an inspection report.

Project justification:
It has been over 20 years since completion of most of the District's track and structures. Although inspections of some structures have been conducted when signs of structural problems became evident, this has generally happened only in the late stages of structural deterioration. There is a need to inspect all structures on a systemwide basis so structural problems can be corrected at the earliest possible stage of potential problems.

2. TRANSBAY TUBE EARTHQUAKE JOINTS STUDY

Project description:
Obtain professional assessment of the post-earthquake condition of the Transbay Tube earthquake joints, review design criteria, and develop recommendations on monitoring and modifications to the joints as needed.

Project justification:
Visual evidence indicated movement of the earthquake joints after the Loma Prieta Earthquake of October 1989. A preliminary consultant report indicated that some joint cables were misaligned. This condition requires additional services for testing of spare cables to determine the actual capacity of the earthquake joints. The result of this testing would enable the consultant to finalize the subject report and make appropriate recommendations for the required retrofitting work.

3. SEISMIC EVALUATION OF AERIAL STRUCTURES

Project description:
Evaluate aerial structures systemwide for determination of retrofitting requirements based on current seismic design criteria. The evaluation would include recommendations for necessary modifications to the existing aerial structures, based on site specific geotechnical information, to bring them up to the same seismic design standards used for all new BART structures.

Project justification:
Structural design criteria for the existing aerial structures were developed in 1963, and are outdated compared to current standards. In a maximum credible earthquake equivalent to that of 1906, the existing structures are expected to sustain major damage but not to suffer collapse. New structures built to current seismic design criteria will withstand an earthquake of that magnitude with only minor or no structural damage, allowing restoration of revenue service in the shortest possible time. This study would evaluate existing aerial structures and present recommendations on retrofitting requirements.

4.

SEISMIC RETROFIT OF I-580/I-980/RT. 24 INTERCHANGE
(07BC)

Project description:
BART staff assistance to Caltrans for that agency's seismic retrofit of this interchange which crosses over system trackways near MacArthur Station.

Project justification:
This is a Caltrans project to strengthen that agency's aerial interchange above the BART tracks. BART's involvement is to support the Caltrans effort to the extent that Caltrans pays for such support.

5.

SEISMIC SENSING UPGRADE

Project description:
Design and install a system of seismic detectors in train control rooms and at critical wayside locations, and tie this system into the train control equipment to slow or stop trains, and into the Central Computer System to inform the Central Supervisor for appropriate action. The specific scope of the project would be determined in an initial study phase.

Project justification:
This system would augment the seismic detection already in place to provide more coverage, more detailed and accurate information, and to permit faster response to protect the safety of the rail system and its patrons.

6.

SEISMIC GAS SHUT-OFF VALVES

Project description:
Install automatic seismic gas shut-off valves at gas meters in District facilities systemwide.

Project justification:
Access to gas valve rooms could be extremely difficult following a severe earthquake. This project would make the shut-off of gas valves automatic during an earthquake, eliminating potentially major property damage and dangers to public safety.

7.

ADDITIONAL STATION ESSENTIAL POWER
(20HB)

Project description:
Purchase and install equipment and batteries to upgrade essential train control power systems.

Project justification:
The essential power systems allow equipment deemed necessary for safe operations to continue to have power for at least 90 minutes during power failures, as may be caused by an earthquake or other emergency. Inadequacies in the existing system would be corrected with this upgrade project.

8.

EARTHQUAKE STANDBY POWER (PHASE I)
(15-C)

Project description:
Install three 480 volt engine-generators (one in the West Bay, one in the East Bay and one at the Transbay Tube) for the event of a possible 480 volt PG&E power loss due to an earthquake or other emergency.

Project justification:
During the October 1989 earthquake many stations were without 480 volt utility power. Emergency lights were designed for only 30 to 90 minutes. Essential power systems were designed for 90 minutes. The line sump south of Powell Street Station came close to flooding the tracks and would have were it not for a borrowed mobile engine-generator. This project would provide greater operational flexibility and safety in the event of a major emergency.

9. EARTHQUAKE STANDBY POWER (PHASE II)

Project description:
Provide engine-generator operated, standby emergency electrical power for the Berkeley Hills Tunnel, the Berkeley Subway and the Outer Market Subway.

Project justification:
See the Phase I project listed above.

10. UPGRADE EMERGENCY LIGHTING SYSTEMS IN STATIONS

Project description:
Upgrade the emergency lighting system to ensure compliance with the latest codes and ensure adequate lighting coverage and time to evacuate stations.

Project justification:
This project would provide increased lighting for safe evacuations of stations during emergencies with loss of power.

11. SEISMIC RESTRAINTS FOR OVERHEAD CRANES IN SHOPS

Project description:
Provide restraints on the overhead crane structures at the maintenance shops, to protect against their toppling over during a major earthquake. This project would be withdrawn in the event that a different project is implemented to replace the aging cranes entirely, in which case that project would specify the necessary seismic restraint.

Project description:
Overhead cranes could jump their tracks during a major earthquake, posing an extremely serious safety risk to employees in the area.

12. SEISMIC RESTRAINTS FOR VEHICLE STANDS IN SHOPS

Project description:
Provide tie-downs for the stands that transit vehicles are supported on during maintenance at the shops.

Project justification:
Vehicles without tie-downs could topple off of the stands during a major earthquake, posing an extremely serious safety risk to employees in the area.

FIRE SAFETY AND PASSENGER EVACUATION PROJECTS

13. FIRE DEPARTMENT TELEPHONE NETWORK

Project description:
Install telephone jacks and support equipment in all underground sections of trackway for local fire department use during emergencies.

Project justification:
Numerous consultants and local fire departments have identified a need for clear and reliable telephone communications in the BART underground. This project would furnish a dedicated fire department telephone line throughout the underground, extending a system already in place in the Berkeley Hills Tunnel and the Transbay Tube.

14. REPLACE STATION AND FACILITY FIRE ALARM SYSTEMS

Project description:
Replace the existing fire alarm systems in stations and other District facilities.

Project justification:
The existing alarms are obsolete and no replacement parts are available. This project would improve public safety.

15. VENT FAN IMPROVEMENTS

Project description:
Improve fan blade mounting of 78 vent fans and replace two of the vent fans. These fans are used to vent tunnels in the event of fire.

Project justification:
The present mounting arrangement of the fan blades induces a high stress concentration which has in the past caused blade failure. Three fans have been improved, operated and tested to confirm the validity of the improvement. Additional capacity is desirable at two other fans in the Oakland Wye to prevent smoke accumulation in the tunnel when operating in the exhaust mode.

16. TRANSBAY TUBE VENTS AUTOMATIC POWER TRANSFER

Project description:
Provide for automatic power transfer between the two Transbay Tube vent structures.

Project justification:
Currently, in case of loss of power to one vent structure, power feed from opposite vent must be set up manually, requires two crews, has the possibility of procedural failure, and takes at least 30 minutes. This complication would be corrected by this project.

17. TRANSBAY TUBE FAN AND DAMPER IMPROVEMENTS

Project description:
Provide redundant power to the exhaust dampers in the Transbay Tube by adding automatic transfer switches, and provide positive indications for damper commands, local control switches, and low voltage alarms for the Tube exhaust fans.

Project justification:
These improvements would enhance the emergency ventilation system for the Transbay Tube by indicating clearly whether the exhaust damper is opened or closed, and whether the exhaust fans are under remote control of Central.

18. REPLACE EXISTING FAN CONTROLLERS IN THE BERKELEY HILLS TUNNEL

Project description:
Replace the existing fan controllers for the Berkeley Hills Tunnel with a more fault tolerant system.

Project justification:
During an emergency involving excessive smoke conditions, a fault tolerant fan controller system would provide better ventilation and expedite the safe evacuation of passengers.

19. IMPROVE BERKELEY HILLS TUNNEL FIRE PROTECTION WATER SUPPLY SYSTEM

(03FM)

Project description:
Install a fire main in the south bore and hose valves every 300 feet in both bores of the Berkeley Hills Tunnel.

Project justification:
With these improvements fire fighters could effect a quicker response to fires in the tunnel, improving public safety.

20. TUNNEL HOSE VALVE LOCATIONS PLAN

Project description:
Complete a plan coordinating the tunnel hose valves with their primary and secondary sources of water, and input this information into emergency response systems.

Project justification:
This information would enable a Central Control console operator during an emergency to know the primary source of water for any particular hose valve, and where the secondary source is located should the primary source fail.

21. STATION AND TUNNEL FIRE PROTECTION IMPROVEMENTS

(15AZ)

Project description:
Provide fire department connections at 11 above-ground stations; extend fire mains at 20 above ground stations; and replace seven failed dry standpipes with fire mains in the tunnels, including hose storage cabinets and a fire main in the Muni tunnel between Powell Street Station and Civic Center Station.

Project justification:
With these improvements, fire fighters could effect a quicker response to fires at stations and in the tunnels.

22. MOTORIZE VALVES ON BERKELEY HILLS TUNNEL FIRE MAINS

Project description:
Install motorized valves in the fire mains of the Berkeley Hills Tunnel.

Project justification:
With the motorized valves, a water main break due to an earthquake or derailment would lose just the water in the main, and not affect the water in the public water supply.

23. REPLACE DRY WITH WET STANDPIPES IN TUNNELS (15BH)

Project description:
Replacement of 56 dry standpipes in tunnels with fire mains and hose valves spaced every 300 to 370 feet.

Project justification:
With these improvements fire fighters could effect a quicker response to fires in the tunnels.

24. DRY STANDPIPE AT I-680 AND SPRINGBROOK ROAD OVERCROSSINGS

Project description:
Provide fire fighting hose valves at every 300 feet along the I-680 and Springbrook Road overcrossings.

Project justification:
The I-680 overcrossing is 760 feet long and 53 feet high. The Springbrook Road overcrossing is 500 feet long and 38 feet high. Fire fighting on these overcrossings would be extremely difficult without standpipes.

25. ADDITIONAL INSULATION AT 12TH & 19TH STREET STATION WALLS

Project description:
Provide electrical insulation at the 12th and 19th Street Station walls, as well as on aerial structure guard rails systemwide.

Project justification:
This project would be a preventative measure against arcing faults similar to those which started fires at 19th Street Station and at 7th and Wood Streets near West Oakland Station in 1989 and 1990.

26. TRANSIT VEHICLE BATTERY OVERTEMPERATURE SENSOR (41JJ)

Project description:
Install transit vehicle battery overtemperature sensors and associated electrical circuitry on 340 cars.

Project justification:
Battery charger failure causes batteries to overheat and catch on fire.

27. REPLACE LIGHTING IN TRANSBAY TUBE LOWER GALLERY

Project description:
Replace the lighting fixtures in the lower gallery of the Transbay Tube.

Project justification:
The existing tunnel and subway lighting fixtures are no longer manufactured. Existing fixtures removed from the Transbay Tube lower gallery would be used for spares in the subways. Adequate lighting in the Tube and subway structures is essential for safe evacuation of patrons under emergency conditions.

28. ADDITIONAL BLUE LIGHTS

Project description:
Place additional emergency blue light fixtures in the underground sections of the system. These fixtures identify the Blue Light Stations which provide such emergency facilities as emergency telephone to Central, third rail power shut-off, and identification of the underground location of the caller.

Project justification:
In some areas of the underground Blue Light Stations are not within line of sightt due to curvature of the trackway or obstacles blocking line of sight. This project would correct that situation.

29. INSTALL WALKWAY HANDRAIL AT GAPS

Project description:
Install handrails in the areas of the tunnelways that do not have safety rails installed on the catwalks. For example, in the tunnelways where there are doors, there are no grab-bars immediately in front of the doors or for a short distance adjacent to each side of the doors. One of the solutions is to extend the safety railing immediately adjacent to the doors, and to install horizontal grab-bars directly to the doors.

Project justification:
This project would enhance the safety of workers who have to traverse the gaps in the safety rail provided in the tunnelways. This is critical if trains are allowed through the work area. The handrails would also serve as an important tactile guide to patrons evacuating the tunnels in dark and/or smoky conditions during an emergency.

30. REMOVE WALKWAY OBSTRUCTIONS

Project description:
Removal or mitigation of all obstructions that protrude into the emergency walkway envelope on the underground walkways.

Project justification:
BART's consultant for evaluation of wayside fire safety has recommended the removal of emergency walkway obstructions underground. Public discussion and negotiation with the CPUC staff and the BART Fire Liaison Committee resulted in agreement to remove or mitigate such obstructions.

HAZARDOUS MATERIALS SAFETY PROJECTS

31. HAZARDOUS MATERIAL STORAGE AND CONTAINMENT SYSTEMS

Project description:
Purchase of portable chemical storage buildings for the purpose of providing secondary containment and security for the storage of hazardous materials and waste products located at District facilities.

Project justification:
State regulations addressing the handling and storage of hazardous materials and waste products require secondary containment for these products. Containers of these materials must be provided with sufficient secondary containment to prevent contamination of work areas, sewer drains, soil, and water resources. The containers must be protected from equipment used in the vicinity. The specific secondary containment requirements for hazardous material storage are addressed in local hazardous material storage ordinances enforced by county and city fire departments. In accordance with these regulations, the District must provide secondary containment of hazardous materials and waste products. Upon investigation of the options available, the purchase and use of portable chemical storage buildings was determined to be the most economical way to comply with these requirements.

32. ASBESTOS ABATEMENT

(94--)

Project description:
Asbestos abatement work resulting from damage to building insulation at eight BART stations and the Lake Merritt Administration Building.

Project justification:
The October 1989 earthquake damaged asbestos-containing insulation which has increased the potential for creating airborne asbestos fiber exposure in District facilities. It is desirable to mitigate the damage to eliminate the potential of generating airborne exposure. The asbestos abatement work would be accomplished in two phases. The first phase would address the abatement of damage that has been categorized as having a high potential of generating asbestos fiber exposure. The second phase would address the abatement of damage categorized as moderate and low potential.

ELDERLY AND HANDICAPPED SAFETY PROJECTS

33. STATION STAIRWAY DETECTION

Project description:
Install stairway detection/warning system at the top and base of all station stairways.

Project justification:
This project has been requested by the vision-impaired community, and approved by the BART Elderly and Handicapped Task Force. This project would improve safety for patrons, especially those with vision impairments who are at risk of falling if they cannot see the stairways or cannot otherwise identify the approach to stairs. This project is included in the Board of Directors approved Multi-Year Master Plan of Elderly and Handicapped Projects.

34. ARCHITECTURAL HAZARDS

Project description:
Remove or modify, as feasible, all potentially hazardous architectural barriers and other objects that protrude into walkways in stations and present hazards for patrons, especially the vision-impaired.

Project justification:
This project has been requested by the vision-impaired community, and approved by the BART Elderly and Handicapped Task Force. Preliminary work by the BART Safety Department and the Elderly and Handicapped Task Force has verified the existence of such obstacles and hazards. This project is included in the Board of Directors approved Multi-Year Master Plan of Elderly and Handicapped Projects.

PATRON AND EMPLOYEE SAFETY AND SECURITY PROJECTS

35. REPLACE WINDOWS IN STATION AGENT BOOTHS

Project description:
Replace existing station agent booth windows with shatter-proof windows to protect employees from flying glass when windows are broken by patrons.

Project justification:
There has recently been an increase in the number of windows being broken in attempts to assault agents. This project would provide shatter-proof windows in agent booths to increase safety.

36. POLICE RADIO IMPROVEMENTS

(27UC)

Project description:
Improve police radio coverage by adding several new localized channels and eliminating "holes" in existing radio coverage areas.

Project justification:
Inadequate and unintelligible radio communications sometimes prevent BART Police from summoning help as quickly as desired. This project would alleviate many radio shortcomings.

37. FENCED PARKING LOTS AT STATIONS

(15P)

Project description:
Installation of fences around parking areas of four station parking lots.

Project justification:
Installation of perimeter fencing would restrict access and egress and limit the routes for escape available to criminals.

OTHER SAFETY-RELATED PROJECT

38. ELECTROMAGNETIC FIELD SURVEY

Project description:
Survey the electromagnetic field levels at BART traction substations, passenger stations and other locations to determine exposure levels.

Project justification:
It is prudent for BART to know the electromagnetic field levels on the system in order to make well informed responses to the public and to government agencies.

SYSTEM REHABILITATION PROJECTS

STATION REHABILITATION PROJECTS

39. REHABILITATE ESCALATORS AND ELEVATORS

Project description:
Rehabilitate all station elevators and escalators systemwide.

Project justification:
Station elevators are over 20 years old. Sills, doors and hydraulic components are in need of replacement. Escalators were last rehabilitated in 1985, but the current failure trend indicates that heavily used platform and street units are beginning to increase in failures again. Action must be taken to ensure availability of units for patron convenience, and maintain station accessibility for elderly and disabled patrons.

40. REPLACE FOUR ESCALATORS AT EMBARCADERO STATION

Project description:
Replace the four modular escalator platform units at Embarcadero Station with heavy duty escalator units designed for transit system use.

Project justification:
Modular escalator units have a higher failure rate and cost more to repair in time and material cost than heavy duty standard units. Due to the greater reliability of heavy duty units, patrons would experience fewer escalator failures at BART's most heavily used station, which would improve customer satisfaction. Installation of more dependable units would move patrons more efficiently from the platform level to the mezzanine level. Two ten-car trains in the station have the capability of detraining up to 2,000 patrons at one time. When escalators are out of service, serious platform crowding occurs, creating potential safety concerns.

41. REPLACE BICYCLE LOCKERS

(59AA)

Project description:
Purchase and install 400 new bicycle lockers to replace existing lockers.

Project justification:
The existing lockers are in poor shape and are not secure. Renters complain that lockers are easily vandalized. Since the current lockers are 16 years old, replacement parts for repairs are no longer available. New lockers might encourage more people to use bicycles as access to BART stations.

42. REPLACE ESCALATOR AREA TILE AT MACARTHUR STATION

(07FC)

Project description:
Replace the escalator well tiles at four locations in MacArthur Station.

Project justification:
Over the years, tiles have peeled-off at various locations in the station. The problem is most severe at the escalator wells. This deteriorating tile condition is due to poor bonding between the existing tiles and the base material and the constant movement of the escalator housing against adjacent walls. In order to restore the station to an acceptable condition from architectural and maintainability standpoints, it is necessary to resurface those escalator wells with new tiles. Installation details and bonding materials would be improved over the original construction.

43. REPAIR CONCRETE ROOF AT LAKE MERRITT STATION

Project description:
Repair of damaged concrete roof and waterproofing on the mezzanine level of Lake Merritt Station, in an area under Oak Street. The work would restore the structural and waterproofing integrity of the station roof slab.

Project justification:
A portion of the concrete roof, over the paid area of the mezzanine level, has sustained structural and waterproofing damage. The damage has caused water leakage in the south stairway area making it necessary to close that stairway whenever it rains. The water intrusion will also corrode the reinforcing steel in the concrete roof, causing further structural deterioration as the leak continues.

44. REPLACE LIGHT STANDARDS ON STATION PLATFORMS

Project description:
Replace the light standards on platforms of 19 stations.

Project justification:
The existing fixtures have corroded and need to be replaced. They are over 20 years old, obsolete and no spares are available.

45. REPLACE SEWAGE PUMPS AT UNDERGROUND STATIONS

Project description:
Replace the 28 sewage pumps in underground stations.

Project justification:
The existing pumps are over 20 years old, are wearing out, are becoming uneconomical to repair, and need to be replaced.

46. REPLACE ROLL-UP GATES AT ORINDA AND LAFAYETTE STATIONS

Project description:
Replace large roll-up gates at Orinda and Lafayette Stations.

Project justification:
The gates are over 20 years old, unreliable, becoming uneconomical to repair, and no spares are available. Gate failure forces patrons to walk completely around Lafayette Station. At Orinda Station, patrons must enter through the emergency exit door during roll-up gate failure.

47. REPLACE ROLL-UP GATES IN STATIONS

Project description:
Replace 116 existing motorized roll-up doors and grills.

Project justification:
The existing equipment is 20 years old, wearing out, unreliable, becoming uneconomical to repair, and no spares are available.

48. REPLACE SIDE-WINDING GATES AT STATIONS

Project description:
Replace eight side-winding gates at stations with roll-up gates.

Project justification:
Debris in the gate tracks causes the existing side-winding gates to malfunction and thus to jam open or closed. Replacement with motorized roll-up gates would prevent this problem from occurring.

TRANSIT VEHICLE REHABILITATION PROJECTS

49. REPLACE NON-SERVICEABLE WHEEL ASSEMBLIES AND AXLES

Project description:
Purchase replacement transit vehicle wheels and axles.

Project justification:
Lack of serviceable wheels and axles keep transit vehicles out of service, resulting in overcrowded vehicles and an undesirable level of service for patrons.

50. REPLACE A AND B CARS SIDE DOORS

(41FB)

Project description:
Replace polyurethane foam core doors and door threshold plates.

Project justification:
The A and B cars contain polyurethane foam core side doors. Moisture from rain, dew and cleaning fluids migrates into the foam through the window seals. The polyurethane absorbs the moisture which subsequently causes the foam to swell. The swelling causes the doors to bulge and bind in the door pockets. This binding prevents the doors from closing properly and prevents trains from moving. Door failures cause 14 percent of all rush period train delays. This project would eliminate this source of failure.

51. REHABILITATE A AND B CARS

Project description:
Rehabilitate the original 440 car fleet of A and B cars to obtain an additional 15 to 20 years of service.

Project justification:
The original cars are approaching their design life of 20 years. They are showing signs of failure and are requiring increased maintenance. The problems requiring attention at this time cannot be accommodated by routine maintenance, but require complete teardown and rebuild as appropriate. Cost of remanufactured vehicles is estimated at approximately 50 percent of new car cost.

52. IMPROVE ACCESSIBILITY OF A AND B CARS

Project description:
Modify the A and B cars to have wheelchair accommodation similar to that provided on the C cars, possibly with a flip-up seat. Other modifications may be needed on the transit vehicles upon implementation of the Americans With Disabilities Act (ADA) regulations.

Project justification:
Wheelchair seating modification of the A and B cars has been requested by the wheelchair-using community, and approved by the BART Elderly and Handicapped Task Force. It is included in the Board of Directors approved Multi-Year Master Plan of Elderly and Handicapped Projects. Other vehicle modifications may be required upon implementation of the ADA regulations.

53. OVERHAUL PROPULSION AND FRICTION BRAKE LOGIC

Project description:
Replace aged electronic and electrical components in the A and B car propulsion and brake logic controls. Two printed circuit boards would be completely replaced. Components on five other boards, including the power supply module, would be upgraded.

Project justification:
The components identified are at the end of their reliable operational lives, and are difficult and uneconomic to repair at the level at which they are now failing. Failures cause unscheduled car removals with major disruptions of transit service, along with equipment damage and increased maintenance costs. The level of patron service would improve significantly upon completion of this project.

YARDS AND SHOPS REHABILITATION PROJECTS

54. EXPANSION OF TRANSPORTATION BUILDINGS AT CONCORD, HAYWARD, AND RICHMOND YARDS (01RM, 03PH, 05NF)

Project description:
Rehabilitate and expand train operator break rooms and transportation building facilities at Concord, Hayward, and Richmond Yards and provide adequate facilities to support 74 train service.

Project justification:
Existing personnel facilities are inadequate. This project would provide adequate facilities to support 74 train service. When fully implemented, this project would provide operational savings because of improved operating efficiency.

55. STOREROOM BUILDINGS AT CONCORD AND RICHMOND YARDS

Project description:
Design and construct two 10,000 sq. ft. storage buildings, one each at the Richmond and Concord Yard facilities, to accommodate bulk inventory parts and materials.

Project justification:
Currently, there is insufficient storage space at both the Richmond and Concord Yards to store large inventory items such as traction motors, motor alternators, gear units, crates of brake pads and pallets of cleaning products. Items such as these are currently being stored on the shop floors and outdoors, creating hazards and impeding repair work. The new "captive fleet" concept necessitates increased inventory levels at these locations, which is compounding the storage problem. The new car procurement and A/B car rehabilitation program will also create increased inventory build-ups for which there is no available space.

56. STORAGE FACILITY AT WHIPPLE ROAD YARD

(01R-)

Project description:
Design and construct a 30,000 sq. ft. storage facility at the Whipple Road Storage Yard to accommodate equipment and parts in support of the District's planned extensions program, station rehabilitation program, the A/B car rehabilitation program, and ongoing vehicle maintenance activities.

Project justification:
Construction of the planned extensions will require additional storage of materials at a central site. With this project, the Whipple Yard Storage Area would be used to issue District-furnished materials to contractors on the various extension projects. Additionally, inventory for on-going maintenance activities would be stored at this location. Storage deficiencies now exist at the Hayward and Wayside Storeroom facilities, due in part to increased quantities of items to support the C car program and ATC retrofit program. Residual inventory received from the C car manufacturer is being housed at a rental facility which is filled to capacity. The A/B Car rehabilitation program will require additional storage requirements for new replacement components and old components removed from the vehicles to support those cars awaiting rehabilitation.

57. COMPONENT STORAGE BUILDING AT HAYWARD YARD

(01R)

Project description:
Construct a secured 1,350 square foot building containing 320 lineal feet of pallet-rack shelving for electronic component storage.

Project justification:
The building would be used to store components waiting to be scheduled into the repair cycle. This building would protect electronic and electro-mechanical equipment from the weather, thus preventing damage and deterioration. Secure storage would prevent unauthorized cannibalizing of critical components and assemblies.

58. PAINT AND REPAIR BOOTH FOR A AND C CAR CABS

Project description:
Design and construct a ventilated, climate-controlled maintenance booth for repairing and painting the cabs of A and C cars.

Project justification:
Without a separate dedicated area for this kind of maintenance, valuable shop pit space is utilized to refurbish these cabs. This reduces the availability of the shop pits for other types of work for which use of the pits is essential. The ability to do cab work elsewhere would improve overall vehicle maintenance turn-around time, keeping more vehicles in service and contributing to better patron service.

59. RENEW AND UPGRADE PAVEMENT AND LIGHTING AT SHOPS AND YARDS

Project description:
Resurface, restripe and relamp shop parking lots and access roads at the Concord, Hayward and Richmond Shops.

Project justification:
The condition of the parking lots at the shops have deteriorated due to age and use. Relamping lots would decrease incidents of vandalism and provide a safer environment.

60. UPGRADE RICHMOND YARD LIGHTING AND STORAGE

Project description:
Install lighting in storage areas, install a foreworkers' modular office, and install a canopy to create a rain-sheltered storage area for equipment.

Project justification:
The lighting in certain storage areas used by Vehicle Maintenance is less than adequate. The foreworker does not have an adequate area for administering shift responsibilities. There is not enough protected storage area for the equipment and parts used in vehicle maintenance, and the canopy in the open yard would provide a much needed rain-sheltered storage area for parts.

61. MODIFY TRACTION MOTOR AND ALTERNATOR REPAIR AREAS AT HAYWARD SHOP

Project description:
Redesign Hayward Shop traction motor and motor alternator repair areas.

Project justification:
Planning the capability to overhaul and rebuild traction motors and motor alternators would be a cost savings to the District. Turn-around time would be decreased, eliminating travel time to and from vendors.

62. MODIFY AND IMPROVE DALY CITY TURNBACK AND YARD

Project description:
Modify and improve the Daly City Yard and Turnback to enhance facility operations, reduce maintenance costs, upgrade safety, and increase worker productivity.

Project justification:
The Daly City Yard and Turnback Project has been completed. With operating experience however, a number of miscellaneous issues concerning facility operations, maintenance, safety and worker productivity have become apparent and need to be resolved before the Yard and Turnback can operate at peak efficiency. This project would create a safer and more productive work environment.

63. REPAINT FLOORS AT CONCORD, DALY CITY HAYWARD AND RICHMOND SHOPS

Project description:
Strip, clean and repaint entire shop floors, pits and related work surfaces at Concord, Daly City, Hayward and Richmond Shops.

Project justification:
The shops were initially painted when built and have been "patch painted" as required. Many areas are now chipped, cracked or totally without any paint. The paint makes it easier to clean the floors of dirt and grime and maintain them. The paint also serves as a non-skid surface.

64. ADDITIONAL 1,000 VOLT CAPACITY TO SHOP PITS

Project description:
Provide additional 1,000 volt outlets in transit vehicle repair shops.

Project justification:
The Concord, Richmond & Hayward Shops have only one 1,000 volt outlet each. On the A and B cars this outlet is required to run the motor alternator and air conditioning units, and on C cars to run the inverter, air conditioning units, troubleshoot failures and check out systems during scheduled maintenance. Cars are often held out of service awaiting availability of the 1,000 volt pit. Additional 1,000 volt outlets would provide the shops the ability to work more than one car at a time, resulting in improved transit vehicle availability and better patron service levels.

65. WHEEL TRUING PIT AND MACHINE AT DALY CITY SHOP

Project description:
Provide a wheel truing machine and building at the Daly City Shop.

Project justification:
The District has only one wheel truing machine, at the Hayward Shop, to maintain 4,800 wheels. This new machine would provide additional capabilities to maintain transit vehicle wheels as the size of the fleet increases, resulting in improved vehicle availability and better patron service levels.

66. REPLACE WHEEL TRUING MACHINE AT HAYWARD SHOP

Project description:
Replace the existing wheel truing machine at the Hayward Shop.

Project justification:
The existing machine is 20 years old and is wearing out. This is the only machine the District has to cut and maintain the 4,800 wheels on the revenue fleet. When the machine is down for maintenance repair, this results in

a backlog of worn wheels needing to be reprofiled and if down long enough, cars are held out of service. The existing machine is slow, sometimes taking more than eight hours to cut a set of wheels. The addition of a new machine would support a much higher production rate, resulting in improved transit vehicle availability and better patron service levels.

67. REPLACE WHEEL/ AXLE PRESS AT HAYWARD SHOP

Project description:
Replace the existing wheel/axle press at Hayward Shop.

Project justification:
The existing wheel/axle press built is 69 years old, was bought second hand and modified for the District's use 20 years ago. This machine usually works 24 hours per day, seven days a week to keep up with the demand for axle assemblies. This machine is used to press wheels, axle bearings, gear units and brake disc hubs on and off axles. It must maintain 2,400 axle assemblies for the transit vehicles. This machine is needed to ensure that axle assemblies can be maintained in a timely manner, resulting in improved transit vehicle availability and better patron service levels.

68. ADDITIONAL WHEEL/AXLE PRESS AT HAYWARD SHOP

Project description:
Provide an additional wheel/axle press at the Hayward Shop.

Project justification:
See Hayward Yard wheel press project above. Another press would increase production required with the addition of new transit vehicles, which would accommodate improved patron service levels.

69. REPLACE AUTOMATIC CAR IDENTIFICATION SYSTEM (22EB/23EB)

Project description:
Replace existing Automatic Car Identification System with laser bar code scanners.

Project justification:
The existing car identification system is obsolete and is no longer supported by the manufacturer.

70. REPLACE TURNTABLES

Project description:
Replace the three existing turntables at the Richmond, Concord and Hayward Yards.

Project justification:
The existing turntables are wearing out, have high failure rates, and contribute to longer than necessary vehicle maintenance time. New turntables would permit higher productivity, increased transit vehicle availability, and therefore, better service to patrons.

71. REPLACE YARD ELECTRIC CARTS

Project description:
Replace 12 electric car cleaner carts.

Project justification:
The present carts are over 20 years old and it is more cost effective to replace than to repair them. These carts are vital to car cleaners for timely completion of work.

72. REPLACE YARD CARTS AND CHARGERS

Project description:
Replace 43 additional electric carts and battery chargers in the yards.

Project justification:
The present carts are over 20 years old and it is more cost effective to replace than to repair them. These carts are vital to car cleaners for timely completion of work.

73. REPLACE YARD 1,000 VOLT DISCONNECT SWITCH ENCLOSURES

Project description:
Replace yard 1,000 volt disconnect switch enclosures, which isolate storage tracks and spur tracks.

Project justification:
The enclosures are over 20 years old and have never been replaced. They are failing with increased frequency and are deteriorated beyond economical repair.

74. REPLACE ROLL-UP DOORS AT FOUR MAINTENANCE SHOPS

Project description:
Replace 47 shop roll-up doors at the Hayward, Concord, Richmond and Oakland Shops.

Project justification:
The existing roll-up doors are wearing out and obsolete, and replacement parts are no longer available.

75. REPLACE HVAC IN SHOPS AND STATIONS

Project description:
Replace the heating, ventilation and air conditioning systems in the maintenance shops, train control rooms and station agents' booths.

Project justification:
The present systems are inefficient, waste energy, require major overhaul and are becoming economical to repair. New systems would provide operating efficiencies.

76. REPLACE TRANSIT VEHICLE WASHERS AT THREE MAINTENANCE SHOPS

Project description:
Replace the existing transit vehicle car washers located at the Hayward, Richmond and Concord Shops.

Project justification:
The existing car washers are 20 years old. Steel parts are rusting to a point of failure. Car washers fail to do an adequate job of cleaning the exterior of the transit vehicles, and it is becoming economically unfeasible to continue to maintain this obsolete equipment.

77. REPLACE CRANES AT THREE MAINTENANCE SHOPS

Project description:
Replace the three 10-ton and two 20-ton cranes at the Concord, Richmond and Hayward Yards.

Project justification:
The existing cranes are approaching the end of their useful lives. Replacement would reduce failures and improve the timeliness of transit vehicle repairs, help minimize the number of vehicles out of service and, therefore, improve the level of transit service. Replacements would also include seismic restraints to improve safety for employees in the vicinity.

78. IMPROVE YARD STRAY CURRENT CONTROLS

Project description:
Add small traction power substations in the Richmond, Concord and Hayward Yards to supply power to the local/shop areas separate from the existing yard traction power substations.

Project justification:
This project would reduce corrosion to system structures and yard underground piping caused by traction power stray current. Separation of the traction power for the local/shop area from that for the remainder of a yard reduces the stray current to that amount generated by the local/shop area rather than the entire yard.

MAINLINE REHABILITATION PROJECTS

79. REPLACE RAIL

Project description:
Replace worn curved rail and switch components throughout the system.

Project justification:

Replacement of worn curved rail and switch components are required every three to five years. This benefits passengers by ensuring a smooth and quiet ride by eliminating worn rail. Adjacent homes or businesses also benefit from a quieter zone with less wheel screech. This rail replacement project also prevents rail failures which would cause disruption and delays to revenue service, and enhances safety factors to BART patrons.

80. REPLACE TRACK ACCESSORIES

Project description:
Replace specialized rail components throughout the system such as direct fixation fasteners, insulated joints, rail lubricators, and timber in maintenance-of-way access points.

Project justification:
Various components of the trackway are 20 years old, are failing with increased frequency, and must be replaced. The direct fixation fasteners are used in locations where the rail curves and provides for proper traction for the train while traveling through a curve. Insulated joint failures cause false occupancies. Replacement would provide for reduced component failures and circumvent delays to revenue service. Failure of rail lubricators increases friction between the rails and the wheels causing excess rail wear. Due to exposure to the elements, timber at maintenance-of-way access points are deteriorating and create a fire hazard. Replacement of the timber with fire-proof rubber would reduce the fire hazard and ensure safe maintenance vehicle access to the mainline.

81. REPLACE WOODEN TIES ON CONCORD LINE

Project description:
Replace the existing wooden ties on the Concord Line with concrete ties.

Project justification:
These wooden ties are over 20 years old, are deteriorating, and create a fire hazard. Replacement of the wooden ties would increase stability of the track bed, surface and alignment.

82. ADDITIONAL MAINLINE MAINTENANCE ACCESS POINT AT ASHBY PORTAL

Project description:
Installation of one additional vehicle access point at the Ashby Portal on the Richmond Line. The project includes removal of the existing curb, sidewalk and fences and the installation of access point vehicle pads, gates and fences.

Project justification:
Maintenance-of-way access point #8 in Berkeley cannot be used by maintenance crews after 10 P.M. due to noise complaints by residents. Setting equipment on at maintenance-of-way access point #16 increases run time for equipment by 30 minutes, losing critical track maintenance time. Installation of an additional access point at the Ashby Portal would allow unrestricted set-ons at any time. This would increase track time productivity.

83. REPLACE LINE SUMP PUMPS IN TUNNELS

Project description:
Replace 65 line sump pumps in tunnels and subways systemwide.

Project justification:
The existing pumps are 20 years old, wearing out, and failing at an increasing rate. Spares are seldom available, and repairs are becoming uneconomic.

84. REPAIR LAKE MERRITT SUBWAY TUNNEL

Project description:
Repair and modify damaged portions of concrete subway tunnel under the Lake Merritt Channel.

Project justification:
The concrete surfaces of the subway walls and ceiling have suffered severe delamination in some areas. Reinforcing steel has also been found to be extensively corroded in the areas of concrete delamination. Deterioration of concrete and reinforcing steel is mainly due to water and stray current problems. In order to restore and maintain the full structural strength of the concrete subway, it is necessary to repair and/or modify the damaged concrete structure and to implement appropriate measures to stem any further deterioration.

85. REPLACE TRACTION POWER CIRCUIT BREAKERS

Project description:
Replace the existing traction power G.E. MC-6 circuit breaker components.

Project justification:
The replacement would provide a more reliable traction power system in support of on-time train performance.

86. IMPROVE TRACTION POWER SYSTEM REGULATION

Project description:
Improve traction-power substation regulation to give a flatter characteristic at a high average voltage level.

Project justification:
A flatter contact-rail voltage characteristic with an average value close to 900 volts would improve vehicle performance and improve transit vehicle availability by reducing electrical stressing from low voltage. Improved vehicle availability would result in better patron service levels.

87. IMPROVE TRACTION POWER SUBSTATION RELAYING

Project description:
Improve traction power substation protective relaying by adding rate-of-rise relays to each feeder breaker and by integrating these relays and the negative return ground relay into a coordinated protective scheme for each substation.

Project justification:
Improved traction substation protective relaying would reduce fault damage by early interruption of fault current.

88. RENOVATE AND REPLACE TRACTION RECTIFIER SETS

Project description:
Survey the G. E. traction rectifier sets to determine the expected life. Develop and implement a program of renovating and replacing the equipment.

Project justification:
The original traction rectifier sets have been in service for 20 years. Expert advice must be obtained for refurbishing and replacing this critical equipment to assure the continued reliable performance of the traction power system.

89. REPLACE NEGATIVE RETURN GROUNDING

Project description:
Replace aging diode/mechanical contractor negative return grounding devices with thyristor negative return grounding devices.

Project justification:
The mechanical contractors are nearing the end of their design life, which has already been extended by bearing replacement. A thyristor based system would reduce average negative return to ground voltage by 50 percent and stray current by more than 50 percent.

90. RECABLE TRANSFER TRIP CIRCUITS

Project description:
Reconnect the 1,000 volt circuit breaker transfer trip circuits to the six pair cables provided by the CCN project.

Project justification:
Improved reliability of transfer trip circuits. Circuits would be removed from communication cable wires connected to dedicated six pair cables.

91. CATHODIC PROTECTION OF TRANSBAY TUBE AND RELATED FACILITIES

Project description:
This would be an on-going preventive maintenance and improvement program to ensure the structural integrity of the Transbay Tube (TBT), to be implemented following the immediately critical TBT protection projects listed separately.

Project justification:
Anode arrays must be replaced on a regular basis as they are consumed. Periodic outerskin surveys would provide reliable updated information on the skin condition and change over time.

92. TRANSBAY TUBE OUTERSKIN INSPECTION

Project description:
Inspect the outerskin of the Transbay Tube to determine its physical condition.

Project justification:
The Transbay Tube outer skin is a 3/8 inch thick steel membrane which provides water-tight and structural integrity to the tube. Inspection of the skin would provide information required to evaluate its condition in order to plan for repair, renovation or replacement.

93. REPAIR TBT CATHODIC PROTECTION SYSTEM PHASE I (INSTALL TEN ANODE ARRAYS)

Project description:
Near-term partial repair of the Transbay Tube cathodic protection system, using ten anode arrays and armored cable from stock, to replace ten of the anode arrays that have been consumed.

Project justification:
Cathodic protection current must be maintained to minimize corrosion of the Tube skin in order to preserve its watertight and structural integrity. Immediate replacement of consumed and damaged anode arrays is required to maintain the protective current.

94. REPAIR TBT CATHODIC PROTECTION SYSTEM PHASE II (DESIGN)

Project description:
Develop design for repair of Transbay Tube cathodic protection system and reduction of stray current in approach tunnels.

Project justification:
This project is to develop the design for additional, longer-term repairs to the cathodic-protection system and approach tunnel stray-current control.

95. REPAIR TBT CATHODIC PROTECTION SYSTEM PHASE III (MATERIALS PROCUREMENT)

Project Description:
Purchase 18 anode arrays for replacement of consumed or damaged anode arrays on Transbay Tube cathodic protection system.

Project justification:
Ongoing replacement of consumed and damaged anode arrays is required to maintain the protective current.

96. REPAIR TBT CATHODIC PROTECTION SYSTEM PHASE III (INSTALLATION)

Project description:
Replace 18 inoperative anode arrays on the Transbay Tube cathodic protection system. Reinsulate rails in the San Francisco approach tunnels to determine condition of stray current control devices.

Project justification:
Ongoing replacement of consumed and damaged anode arrays is required to maintain the protective current.

97. REPAIR OF CATHODIC PROTECTION SYSTEM FOR SAN FRANCISCO FERRY BUILDING PILES

Project description:
Replace consumed anodes and damaged cables of the cathodic protection system for the piles that support the San Francisco Ferry Building over the BART tunnels.

Project justification:
Cathodic protection of the piles must be maintained to prevent corrosion of the piles and resultant loss of structural support for the Ferry Building over BART structures.

98. INSULATE RAIL FASTENERS

Project description:
Insulate rails where wet conditions cause shorting of existing rail fastener insulation. Complete development of insulating device by selecting optimum material through a test program, procure insulating devices, and install devices at Lake Merritt estuary and San Francisco approach tunnels.

Project justification:
Improved rail-fastener insulation is required to stop stray current which is causing corrosion of rail, rail fasteners and structures.

OFFICE REHABILITATION PROJECTS

99. REMODEL LAKE MERRITT AND METROCENTER ADMINISTRATIVE BUILDINGS

Project description:
Remodel Lake Merritt Administrative Building's concourse and platform levels to upgrade BART Police offices, locker rooms, and restrooms and provide space for Automatic Fare Collection (AFC) Component Repair offices. Also, remodel offices on the MetroCenter second floor to provide additional for AFC Component Repair and other offices.

Project justification:
Remodeling of these areas is needed to accomodate BART Police and other District personnel.

100. REPLACE HVAC AT LAKE MERRITT ADMINISTRATION BUILDING

Project description:
The purpose of this project is to replace the existing heating, ventilation, and air conditioning system at the Lake Merritt Administration Building.

Project justification:
The existing system is inflexible, inefficient, wastes energy and is becoming uneconomical to repair. A new system would provide operating efficiencies.

101. REPLACE HVAC AT CASH HANDLING BUILDING

Project description:
The purpose of this project is to replace the existing heating, ventilation and air conditioning system at the Cash Handling Building.

Project justification:
The existing system is inflexible, inefficient, wastes energy and is becoming uneconomical to repair. A new system would provide operating efficiencies.

REHABILITATION AND REPLACEMENT OF COMPUTING AND COMMUNICATIONS EQUIPMENT

102. CENTRAL CONTROL TRANSITION PART II--REMOVE OLD EQUIPMENT (61KD)

Project description:
This project covers Part II of the ongoing Central Transition Project. Part II covers the removal of the P250 Computer System and its associated work stations, cabling, equipment cabinets, electrical service, and miscellaneous items. The project also covers a portion of the work for the installation of the new work stations and the new Central Display System.

Project justification:
The work is required, in part, as a restoration of the Central Control Room (reconfigured to accommodate the dual operations phase of the Central Transition Project), and to provide a means of disposing of the old P250 Computer System to make way for new cabling and work stations that will be required for the extensions projects. The project would also provide the site preparation work for the new workstations and the new Central Display Boards.

103. CENTRAL CONTROL COMMUNICATIONS UPGRADE (27OC)

Project description:
Provide upgraded communication capabilities and control consoles in BART Central Control.

Project justification:
Needed for improving communications and work flow within Central.

104. UPGRADE CENTRAL COMPUTER SYSTEM EQUIPMENT (62AB)

Project description:
Continue the development of and enhance the operation of the Central Computer System (CCS). It has been the District's experience with the previous computer system that continuing enhancements are necessary to keep the system current with operational needs. Similar upgrades and enhancements will be required for the new CCS.

Project justification:
The CCS software was developed at considerable expense to the District. It is planned that this software remain current to BART's needs over the next decade or longer. CCS software will continually undergo dynamic evolution as the needs of the District change. As computer hardware for the CCS changes, the CCS software will be migrated to the new hardware, contributing to the long service life of the software.

Another requirement to extend the viability of the Central Computer System is the replacement of the Controllers' workstations. Textronics, the manufacturer of the current workstations, has gone out of the workstation business. These ten year old Textronic workstations cannot meet the complete functional requirements as now known, and they are also technologically outdated.

105. CENTRAL CONTROL DISPLAY BOARDS FOR THE DALY CITY TURNBACK

(60GL)

Project description:
The project is part of the Daly City Turnback (DCTB) project. The requirement is to modify the existing display boards to include DCTB track and electrification controls.

Project justification:
The display board needs to be updated to provide the Central Control staff with an accurate and complete overview of the system. The graphics driver software development would also provide the flexibility to add extension displays without further hardware modifications.

106. REPLACE MIS MAINFRAME COMPUTER

(65BC)

Project description:
Immediate replacement of the Management Information System (MIS) main computer processor and peripheral storage (disk, tape, and printers).

Project justification:
The existing equipment has been in around-the-clock operation for ten years. This results in unacceptable levels of downtime and high repair costs. In addition, the equipment restricts the amount of data that can be retained, and response time at the terminals has continually degraded. The new equipment would reduce the incidence of repair and potential loss of data.

107. NEXT GENERATION MIS MAINFRAME COMPUTER

Project description:
Provide the next generation of Management Information System (MIS) computer system for the late 1990's, following the lifetime of the computer currently being acquired.

Project justification:
Normal mainframe computer life cycles dictate replacement every five years. This is due to development in technology as well as increased demands for hardware and software services. Increased customer requirements result in capacity limitations of the mainframe computer. This is usually indicated by poor terminal response and insufficient main storage. In order to maintain reasonable service levels, a new mainframe computer will be required.

108. UPGRADE DIGITAL TRANSMISSION SYSTEM

Project description:
Replace obsolete and non-supported system components of the existing Digital Transmission System (DTS). This project would replace the obsolete and non-supported system components. Phase I covers the design and prototype testing of the new components integrated into one or more DTS units. Phase II covers the systemwide upgrading of the DTS. This would be an immediate, short-term fix of an acute problem which could be reduced in scope if the DTS replacement project (listed below) was implemented very soon.

Project justification:
The Central Computer System's DTS is a 20 year old system that has not been supported by the original manufacturer in over 12 years. Therefore, each time it is necessary to expand a DTS unit or restock spares, the District is faced with expensive manufacturing costs. The maintenance factor is also a compelling reason to upgrade

the units to receive "off-the shelf" components.

109. REPLACE DIGITAL TRANSMISSION SYSTEM

Project description:
Install new supervising and control equipment in each of 41 train control rooms, replacing the existing Digital Transmission System (DTS) control equipment.

Project justification:
The existing DTS equipment is an obsolete, unique-to-BART control system that is very awkward and difficult to maintain, virtually impossible to expand, and lacks the ability to perform advanced control tasks without a computer system attached. The replacement network would be an expansion to the system furnished for the extensions.

110. RENEW MARIS

Project description:
Replace software development tools and technology, and provide added functionality for the Maintenance and Reliability Information System as required to handle the extensions and the upgrade in wayside maintenance incident/failure tracking.

Project justification:
The existing software system generator used to build and maintain the Maintenance and Reliability Information System no longer has technical support. This project would provide state of the art program development tools that would support useful programs and reports for assessing transit equipment performance.

111. REPLACE DATA ACQUISITION SYSTEM

(27E-)

Project description:
Procure and install a new Data Acquisition System (DAS) to accommodate new multi-denominational tickets, to integrate with other systems to facilitate a comprehensive reconciling system, and to relieve the burden on maintenance.

Project justification:
The obsolete Data Acquisition System is no longer supported in the industry, nor does it have the expansion capability to accommodate the extensions or any proposed existing system changes.

112. DEVELOP PROTOTYPE UPGRADED STATION AGENT CONSOLE

Project description:
Develop prototype upgrade to consoles to replace obsolete components with state of the art solid state components, and expand functions. Install prototype units in four stations.

Project justification:
Components are no longer available on the market, and the subsystems have no expansion capability.

113. REPLACE CENTRAL VOICE RECORDING SYSTEM

Project description:
Replace, upgrade and increase the capacity of the Central Voice Recording System (two 20-channel recorders, a 56-channel recorder and four playback machines) with a microprocessor-controlled voice recording system. The system would add voice channels for PABX, emergency telephone, train radio, hot line, public address and intercom for each of the four yards.

Project justification:
The current recorders used in the District's safety sensitive recording system are unreliable due to age and maintenance problems. The equipment is 18 years old, is obsolete, and parts are no longer available. A recent yard safety audit recommended a secure yard voice recording system be instituted to prevent the possibility of tampering. The current system capacity must be increased to support additional remote recorded voice channels. Upgrading the present equipment with an expandable microprocessor-controlled system would also support system extension requirements for additional voice channels.

114. STUDY OF REPLACEMENT OF DESTINATION SIGN SYSTEM (91AH)

Project description:
Determine requirements for replacement software and signhead requirements for the Destination Sign System (DSS). Audio capability of the announcement system is to be included in the study. The study will feed into the Next Generation Central Computer System project which would include replacement of the DSS.

Project justification:
The computers that run the Destination Sign System (DSS) are 20 years old, obsolete, and difficult to maintain. The signheads are also 20 years old and no longer manufactured. Additional functionality of the DSS, for example to serve the extensions, is not possible on the current hardware or software. The DSS study will result in a requirements package that identifies all current and known future requirements of the Destination Sign System.

REPLACEMENT OF CASH HANDLING AND RELATED EQUIPMENT

115. STUDY REPLACEMENT OF AUTOMATIC FARE COLLECTION EQUIPMENT SYSTEMWIDE

Project description:
Analyze existing system needs for quantities, locations, and features of vendors, addfares and faregates to determine the timing and requirements for replacing, refurbishing, or enhancing all existing automatic fare collection (AFC) equipment.

Project justification:
Existing AFC equipment may be reaching the end of its useful life. Needs for equipment refurbishment, replacement, and enhancement must be determined and addressed.

116. REPLACE AUTOMATIC FARE COLLECTION EQUIPMENT SYSTEMWIDE

Project description:
Systemwide replacement of all existing automatic fare collection equipment, based on the results of the study listed above.

Project justification:
The existing equipment has been in service for 20 years. It is worn, parts are all custom-fabricated, and the electronics are unable to provide needed treasury, security, and maintenance information.

117.

REPLACE AC TRANSIT AND MUNI TRANSFER TICKET MACHINES
(47CA)

Project description:
The purpose of this project is to replace 16 Muni and 20 AC Transit transfer ticket machines.

Project justification:
These transfer machines have never been replaced, experience unacceptably high failure rates, and are becoming uneconomical to maintain.

118.

REPLACE CASH HANDLING EQUIPMENT

Project description:
Replace cash handling equipment that is obsolete and not cost effective to repair, and purchase one additional sorting and counting machine.

Project justification:
Cash carts are used to deliver and collect money from the automatic fare collection (AFC) machines. These carts are over 18 years old. Patronage growth and fare increases have caused growth in revenue such that the carts are now too small for many stations and must be filled to overflowing (a loaded cash cart weighs approximately 1800 lbs.). Because the carts were not designed to handle Cubic AFC equipment, this heavy yet fragile equipment is often damaged in transport. As important, the potential for serious personal injury is high. The carts are badly worn with sharp, rusting edges and a poor braking system. Parts for the carts are scarce or nonexistent.

The Currency Verification Counting System (CVCS) is used to count currency collected from the AFC machines. Currently, the District has one CVCS machine which counts and straps different bill denominations. The CVCS machine is very complex and requires considerable maintenance. Frequent breakdowns require emergency calls and subsequent time interval while the call is answered and repairs made. This prohibits deposits from being made on a timely basis. This problem will become even more acute as ridership and revenue continue to increase. Replacement of the existing CVCS machine and purchase of a second one would provide for a quicker currency run and greater employee productivity.

The two existing encoding machines were purchased in 1970 for use in printing tickets for group sales, passenger service office sales and the off-site ticket program. The AC/BART Plus ticket was added in February, 1987. Due partly to age and partly to design, the machines are very unreliable. Over the years, ticket sales have almost doubled in volume, so it is imperative that the machines be continuously operable as there is a need to print tickets on a daily basis. In order to support the BARTPlus and off-site ticket sales programs and encourage their growth, BART must be able to meet the demand for tickets on a timely and reliable basis. Accomplishment of this mission requires that the existing encoders be replaced with reliable and efficient machines.

119.

REPLACE TWO ARMORED CASH-TRANSPORT VEHICLES
(68DD)

Project description:
Replace two armored cash-transport tractor-trailer trucks.

Project justification:
Four armored vehicles are currently used for handling and transporting cash. Two of the existing trucks are overaged and overdue for replacement.

OTHER SYSTEM REHABILITATION PROJECTS

120. REPLACE MAINTENANCE VEHICLES AND EQUIPMENT

Project description:
Replace maintenance and service vehicles and maintenance equipment. This maintenance equipment typically includes such items as tools, power generator sets, light towers, grounds and buildings maintenance equipment, shop equipment, test instruments, light-duty highway vehicles, BART police and personnel sedans, and heavy-duty maintenance vehicles (diesel trucks, tractors, and track maintenance vehicles).

Project justification:
BART's maintenance equipment gradually becomes worn from use. Eventually it becomes more economical to replace the old equipment rather than repair it. The ongoing equipment replacement program assures that old, worn out equipment is replaced in a timely manner to minimize overall costs and ensure personnel safety. If this equipment is not replaced, overall costs will increase, maintenance crews will be disrupted by failed equipment, and service to patrons will deteriorate.

121. REPAIR MISCELLANEOUS EARTHQUAKE DAMAGE

Project description:
Repair of damage to District facilities caused by the Loma Prieta earthquake of October 1989.

Project justification:
Various damaged facilities need to be restored to pre-earthquake condition.

122. REPLACE ROOFING SYSTEMWIDE

Project description:
Replace approximately 50 percent of the roofing throughout the District.

Project justification:
Many of the roofs of the District's buildings are in very poor condition due to age and have a variety of problems. This project prioritizes those roofs with the most severe leakage.

123. UNIVERSAL PRINTED CIRCUIT BOARD TESTER

Project description:
Purchase universal printed circuit board tester.

Project justification:
The District needs to standardize printed circuit board testers. A universal printed circuit board tester would save money in the future, as vendors would not need to develop specialized test equipment. Instead they would be required to supply the appropriate hardware and software for their boards to be tested by the District's universal tester.

OPERATIONS AND SERVICE IMPROVEMENT PROJECTS

TRANSIT INFORMATION IMPROVEMENT PROJECTS

124.

AUTOMATIC TELEPHONE TRANSIT SCHEDULER

Project description:
Furnish and install a computerized information system to replace the manual system now in use.

Project justification:
A computerized system would allow operators to replace pamphlets, books, maps and other paper materials with more consistently updated, reliable and easily accessed electronic information sources.

125.

AUTOMATIC CALL DISTRIBUTION SYSTEM

Project description:
Furnish and install an automatic call distribution system (ACDS) telephone switch.

Project justification:
This equipment would allow transit information operators to answer more calls than can now be answered. Callers would experience fewer busy signals and would receive more information through recorded messages.

126.

REGIONAL TRANSIT INFORMATION CENTERS AND STATION MAP UPDATES

Project description:
Replace, update and improve station maps and passenger information in all BART stations and install a system that is more flexible and more easily updated as information changes occur. The objective of the new system is to provide better information to patrons, to make the information easier to read, and to be more flexible and less expensive to update.

Project justification:
Existing station maps have not been updated since 1972. This project would improve the quality and the amount of information provided to the passengers, and would modify existing display cases to a design that enables information to be easily updated.

STATION FACILITIES AND FARE COLLECTION IMPROVEMENT PROJECTS

127. AUTOMATIC PUBLIC ADDRESS SYSTEM

Project description:
Install new public address equipment to automate and enhance station announcements.

Project justification:
The existing public address system is 20 years old, and is not capable of supporting desirable features. The new public address system would automatically announce train arrival information for all trains at all platforms, and would have the added capability of automatically broadcasting predetermined information at selected stations during system emergencies. These functions would provide significant customer service improvements, especially for vision-impaired people and others who cannot read the train destination signs.

128. UPGRADE STATION PUBLIC ADDRESS SYSTEM

Project description:
Replace obsolete components in the station public address system.

Project justification:
The existing system is deteriorating to the point of being uneconomic to repair on an individual failure basis. It would be more cost effective to do a general overhaul of the entire system to replace those components that are obsolete and subject to frequent failure.

129. STATION SIGNAGE AND ORIENTATION IMPROVEMENTS

Project description:
Improve station area mobility by providing a new station signing program that would include more and larger directional signs to telephones, elevators, restrooms etc. Also provide orientation assistance devices such as a facility and sign color coding system to assist developmentally disabled and non-English speaking patrons; tactile maps and/or recorded descriptions of station facilities and how to get to them, along with tactile guide surfaces to help vision-impaired patrons locate various facilities; and other such aids.

Project justification:
This project has been requested by the disabled community, and approved by the BART Elderly and Handicapped Task Force. It is included in the Board of Directors approved Multi-Year Master Plan of Elderly and Handicapped Projects.

130. TELECOMMUNICATION DEVICES FOR THE DEAF

Project description:
Provide at least one telecommunication device for the deaf (TDD) at each station.

Project justification:
This project has been requested by the hearing-impaired community and approved by the BART Elderly and Handicapped Task Force. Currently, people who have seriously impaired hearing are unable to use public telephones in BART stations. Station agents are frequently asked to place calls for hearing-impaired patrons, during which time the agents are unavailable to help other patrons. This project is included in the Board of Directors approved Multi-Year Master Plan of Elderly and Handicapped Projects.

131. STATION ENTRANCE CANOPIES
(15RB)

Project description:
Install 50 canopies over the escalators and pedestrian entry ways at ten underground stations in San Francisco, Oakland and Berkeley.

Project justification:
This project would result in weather protection for patrons entering the stations, reduced escalator maintenance costs, less escalator down time, increased security during non-revenue service periods and generally improved access to stations.

132. ADDITIONAL WOMEN'S RESTROOMS AT EMBARCADERO, MONTGOMERY AND POWELL STATIONS

Project description:
Increase the number of women's restrooms at Embarcadero, Montgomery and Powell Street Stations. Open floorspace in the existing men's and women's restrooms would be reduced to make room for an additional women's/handicapped restroom at each of the three stations.

Project justification:
This project would provide customer convenience. Also, current California Building Code Amendments require three times more fixtures for women than for men for public occupancies.

133. PLATFORM LIGHTING IMPROVEMENTS AT EMBARCADERO, MONTGOMERY AND POWELL STATIONS

Project description:
Replace the indirect light fixtures with direct light fixtures at these three stations. The lamps of indirect lights are hidden from view. Lighting is accomplished by reflection from ceiling and walls. Direct lighting shines down on the platforms.

Project justification:
Experience indicates that indirect lighting is not efficient in the transit environment. Subway dirt slowly covers the top of lamps and gradually reduces the lighting level being reflected by the ceiling and walls. This project would reduce maintenance requirements while improving patron comfort.

134. MODIFY STATION AGENT TICKET READERS

Project description:
Modify existing ticket encoders to read all ticket formats. The modified ticket reader would provide station agents with the capability to read any portion of the ticket and would provide the capability of reading to the data-bit level.

Project justification:
This modification is needed to read ticket formats such as BARTPlus, the Universal Ticket, and others as needed.

135. ADDITIONAL FAREGATES AND FARECARD VENDOR VAULTS AT 12TH STREET STATION

Project description:
Provide additional faregates to handle the increasing patron flow at the Plaza entrance. Additionally, provide two more vendor vaults for either change machines or ticket vendors, or a combination of a changer and vendor.

Project justification:
A potential safety problem of unloading an escalator into a relatively small paid area with only three exit gates would be eliminated by increasing the number of available exit gates.

136. ADDITIONAL FAREGATES AT EMBARCADERO STATION

Project description:
Install four additional faregates to existing gate arrays at Embarcadero Station.

Project justification:
Additional gates would help process patrons into and out of the system more quickly. This would be a customer service and patron safety improvement to reduce crowding at gates, and it would greatly reduce overcrowding during special events in downtown San Francisco.

137. IMPROVED ACCESSIBILITY OF FARECARD VENDOR AND CHANGE MACHINES

Project description:
Improve the accessibility of farecard vendors and change machines by lowering one of each type, or adding a new lower-mounted one of each type, at each station---with color-coded pictorial instructions and buttons, and Braille labelling, in order to better accommodate people in wheelchairs, short people, people with vision impairments, and those who do not read English.

Project justification:
This project has been requested by the disabled community and approved by the BART Elderly and Handicapped Task Force. Use of the existing farecard vendors and change machines can be very difficult for some people, if not impossible, without assistance from other people in the station. Such assistance is not always available or desired by the patron. This project is included in the Board of Directors approved Multi-Year Master Plan of Elderly and Handicapped Projects.

138. ADDITIONAL FARECARD VENDORS AND ADDFARES FOR NINE STATIONS

Project description:
Procure and install nine farecard ticket vendors and eight addfare machines at existing stations to handle patronage increases.

Project justification:
These machines will be necessary to provide an acceptable level of service (without undue waiting in line) to patrons who purchase farecards or use addfares at these nine stations.

139. MULTI-OPERATOR PASS/UNIVERSAL TICKET PROGRAM

(44--)

Project description:
The Universal Ticket Program encompasses four interrelated projects, which together will test the feasibility of extending BART's stored value fare payment system to interconnecting bus systems. Three of the four projects are funded, as follows: Stored Value Equipment for BART Express and CCCTA buses; Cubic Faregate Modifications; and Credit/Debit Vendors. The fourth related project remains unfunded: Credit/Debit Vendor Vaults.

The first project addresses the procurement of on-board ticket validators for all BART Express and County Connection (CCCTA) buses, to accept and process stored value magnetic stripe tickets on the buses in a manner similar to that used in BART faregates. The second project modifies existing Cubic faregates in BART stations to accept and process Universal Tickets, to parallel equivalent modifications already installed in all IBM faregates. The third project addresses procurement of a new type of ticket vendor which both provides a distribution system for Universal and BARTPlus tickets and tests patron acceptance of payment using either credit cards or bank debit (ATM) cards. The Credit/Debit Vendor Vault project is an unfunded but critical remaining project needed to construct new vaults in stations requiring Credit/Debit Vendors but having no vacant vaults.

Project justification:
This regional coordination project involves demonstrating the feasibility of expanding the BART stored value system to connecting bus systems, and testing the acceptance of electronic (credit/debit) payment systems in a transit environment. Expansion of the stored value system may be potentially the best way to accomplish regional transit coordination goals. Use of electronic payment systems could offer a significant service improvement to patrons while also introducing benefits of tighter revenue collection control, faster funds availability, and potential cost savings.

140. TEMPORARY VENDORS FOR THE UNIVERSAL TICKET PROGRAM

Project description:
Lease or purchase simple cash-only vendors to distribute Universal Tickets. The period lacking a means for ticket distribution is from the beginning of revenue service using the on-board stored value bus equipment to the implementation of the Credit/Debit Vendor project, which will ultimately provide the permanent Universal Ticket distribution system.

Project justification:
There will be no means of distributing Universal Tickets for at least nine months to one year, and this program cannot be implemented without an effective ticket distribution system.

TRANSIT VEHICLE AND TRAIN OPERATIONS IMPROVEMENT PROJECTS

141. ELECTRONIC DESTINATION SIGNS FOR A CAR CABS (41KD)

Project description:
Install electronic, changeable message train destination signs behind the windshields of the A car cabs.

Project justification:
This project would provide patrons with destination information in a more readable format than is possible with the previously used plastic signs.

142. ON-BOARD VISUAL INFORMATION DISPLAYS

Project description:
Install a visual communication system on trains to advise patrons who have difficulty hearing or understanding the train operators' verbal announcements of station stops and information about service disruptions, emergencies, etc. This system could include electronic, running-dot-matrix message signs mounted above the doors at each end of the transit vehicles.

Project justification:
This project has been requested by the hearing-impaired community, and approved by the BART Elderly and Handicapped Task Force. Many patrons, not just those with hearing impairments, experience difficulty hearing or understanding the verbal announcements. This project would improve passenger information and generally facilitate trip-making for many patrons.

143. ADVANCED AUTOMATIC TRAIN CONTROLS

Project description:
Develop and test an automatic train tracking and control system which would provide the lowest theoretically possible headway. Train tracking would be performed by radio data links carrying train position and speed information. Train protection and control would be based on a moving block concept which would take full advantage of the position and speed information provided by the train tracking system.

Project justification:
The Extension Service Plan concludes that headways as low as 2 minutes will be required when the Pittsburg and Warm Springs lines are operational. To support operations after that time, headways even lower than 2 minutes may be required. This project would research and develop train control technology to make such operation possible.

144. RETROFIT STATIONS WITH REDUNDANT POWER SUPPLIES

Project description:
Replace the power supplies in the train control automatic train operation system, interlocking, and multiplex cabinets with redundant supplies.

Project justification:
Power supplies fail at a rate of about three per month. Each failure creates a delay to an average of ten trains, of ten or more minutes per train. These failures would be reduced from about three per month to about three per year.

145. REPLACE TRACTION POWER BATTERIES

Project description:
Replace the existing control batteries in traction power substations.

Project justification:
These batteries are approaching the end of their useful lives.

146. PORTABLE TRACTION POWER SUBSTATION

Project description:
Procure a portable traction power substation for use during outages of existing rectifier sets.

Project justification:
The existing equipment is aging and requires a backup for outages caused by breakdown or removal for replacement.

147. VEHICLE ATC RESTORATION UNIT PROTOTYPE DEVELOPMENT

Project description:
Develop a prototype Automatic Train Control (ATC) restoration unit consisting of a microprocessor, relays and support equipment to detect "safety error terminations" of the vehicle ATC, pinpoint the source of the failure, and automatically reconfigure the equipment to restore ATC operation in minimum time and with a high probability of success.

Project justification:
The new vehicle ATC now in use involves three processing cradles, two of which are required to operate the train, with the third one available as a backup in case of failure. If one cradle fails, this causes a "safety error termination" which will stop train movement and require the train operator to reconfigure the cradles to restore operation. Difficulty in recovering from these situations is a significant source of ATC-caused system delays. The proposed unit would substantially reduce recovery time from these failures, improve identification of failed cradles, and aid in the troubleshooting of failed cradles.

148. ELIMINATION OF THIRD RAIL VOLTAGE SAG USING SUPERCONDUCTING MAGNETIC ENERGY STORAGE DEVICE

Project description:
Research superconducting magnetic energy storage (SMES) technology to determine if use of this technology can prevent the drop in third rail voltage experienced in sections of the track where the distance between substations is too great for the density of traffic. As part of this project, a SMES device would be procured and tested at the Hayward Test Track and on mainline track.

Project justification:
The vehicle propulsion logic is designed to drop to a reduced performance level when the third rail voltage drops to less than 880 volts and to completely cut out when the voltage drops to less than 750 volts. In some areas, such as in the Transbay Tube, it is not possible to install additional substations to bolster the third rail voltage to keep them above the critical voltages. This project would determine if small scale superconducting magnetic energy storage devices can be used to supplement substations to prevent the third rail voltage from dropping below 880 volts.

149. SECOND GENERATION ATC ON A CARS

Project description:
Purchase and install new automatic train control (ATC) equipment on the A cars.

Project justification:
Higher ATC reliability is needed in order to support planned increases in service levels. The new ATC design would provide the required reliability.

150. REVISED SIGNAL ALGORITHM STUDY

(20FG)

Project description:
Conduct a study of the brake rate algorithm.

Project justification:
Determine methods to lower design headway to 90 seconds on the M-Line to achieve an operating headway of 2 minutes 15 seconds.

151. WAYSIDE TRAIN CONTROL AND SYSTEM PERFORMANCE MODIFICATIONS

(20--)

Project description:
Move existing shunts and add new shunts to increase the number of track circuit blocks and decrease the lengths of the blocks to approximately 350 feet, primarily on the M-Line.

Project justification:
This project would be necessary to reduce the minimum headway to 2 minutes 30 seconds.

152. OPTIMIZE SPEED PROFILES

(20FD)

Project description:
Plan and design corrective modifications and implement the changes needed to improve throughput and system performance.

Project justification:
Improvement needed to improve throughput and system performance.

153. TIMELOCKING MODIFICATIONS
(20BF)

Project description:
Change timelocking for all interlockings by installing solid state timers.

Project justification:
This project would be necessary to reduce the minimum headway to 2 minutes 30 seconds.

154. ELIMINATE STATION INTERFACES
(20AC)

Project description:
Provide the necessary interstation cables and complete other required modifications to the train control equipment to eliminate constraints to reducing headways at 11 locations.

Project justification:
This project would eliminate false occupancies between interlockings, which would permit reduced headways.

155. YARD IMPROVEMENTS
(2-BB)

Project description:
Additional storage tracks were installed in 1978 at Concord and Hayward Yards. The majority of the wayside hardware was installed at that time (i.e. switch machines and dwarf signals), but the circuitry and changes to the yard consoles for operation of the tracks has not been done. Richmond also requires routing changes and an additional 240 feet of track.

Project justification:
Required to support 55 train service.

156. REPLACE HAND-THROW TRACK SWITCHES WITH POWERED SWITCHES

Project description:
Replace nine mechanical, hand-throw track switches in the storage yards with trailable powered switches. This project would also install pole-mounted push-buttons and detector circuits at each new switch machine.

Project justification:
The replacement of the hand-throw switches in the local control area would reduce the amount of time required for train movements.

157. TRACTION POWER ELECTRICAL CAPACITY IMPROVEMENT
(15EG)

Project description:
Increase power distribution on the C-Line and in all three East Bay yards. This includes installation of two new substations, modification and upgrade of existing yard substations, third rail modifications and an increase of yard feeder-cable capacity.

Project justification:
Engineering studies have shown that improvements are required to satisfy equipment capacity limits and contact-rail voltage criteria when supplying energy for increased levels of train service. Additional aluminum contact rail is required to reduce voltage drop in the run between Orinda and Lafayette, and two new substations are required to reduce the distance between substations and further correct the voltage drop. Additional conductor capacity is required at all three East Bay yards, and an additional transformer-rectifier set is required at Concord Yard to keep equipment within capacity limits while supplying the additional load of a greater number of vehicles.

STATION ACCESS IMPROVEMENT PROJECTS

158-165. STATION PARKING AND BUS TRANSFER FACILITY IMPROVEMENTS

Descriptions of projects:
The following projects would increase the overall accessibility of these stations by adding both more patron parking and more bus handling capacity. Multi-level parking structures are proposed to be built on existing BART-owned surface parking lots.

Improved bus transfer facilities would also be provided, including increased capacity to accommodate more buses, timed-transfer operations where those are planned by bus operators, weather-sheltering for waiting passengers, additional and better transit information displays, and other patron amenities. Bus, patron parking, and kiss/ride traffic would be separated for improved operations and safety.

At other stations, both parking and bus facilities would be expanded, but are listed in separate groupings below because the funding for the two components is expected to come from different sources at different times, and therefore must be viewed as separate projects. And at still other stations, either parking only or bus facilities only would be expanded, and those projects are also listed in separate groupings below.

Index #	Site and FMS #	Project Parking Capacity	Bus Capacity
158	Concord (03SH)	950 (600 net new)	22 (11 net new)
159	Walnut Creek (03LG)	1,300 (800 net new)	18 (9 net new)
160	Lafayette (03JG)	800 (500 net new)	TBD*
161	Orinda (03HJ)	800 (500 net new)	TBD*
162	El Cerrito Pl. (BBXX)	800 (500 net new)	TBD*
163	Fruitvale (01GH)	1,050 (500 net new)	11 (7 net new)
164	Hayward (01OG)	1,200 (650 net new)	17 (0 net new**)
165	Union City	950 (600 net new)	16 (13 net new)
	Totals (gross)	**7,850 plus TBD***	**84 plus TBD***
	Totals (net)	**4,650 plus TBD***	**40 plus TBD***

* to be determined ** permanent facility to replace temporary accommodation

Justification for projects:
All of these stations experience severe patron access constraints. The parking fills early in the morning peak period, limiting access to the system later in the day when ample passenger-carrying capacity is available on trains. This negatively impacts potential patronage growth and fare revenue generation. These projects would help alleviate this constraint.

The bus handling improvements are essential to accommodate service improvements being planned by connecting bus operators, primarily AC Transit and CCCTA (County Connection). The planned capacity increases would accommodate these higher levels of service. Additional patron comfort and convenience amenities would be needed to attract patrons to such new capacity.

Traffic circulation problems and pedestrian/vehicle conflicts impair the efficient operation of the existing access facilities at these stations, and create potential safety concerns. The planned separation of different modes of traffic, together with better channelization and protection of pedestrians, would address these problems.

The operations of AC Transit, CCCTA (County Connection), Samtrans, and Union City Transit would benefit from implementation of these projects, as would the patrons who would use them.

166-176. STATION BUS TRANSFER FACILITY IMPROVEMENTS (TRANSIT CENTERS)

Descriptions of projects:
Bus transfer facilities would be expanded and improved at the following stations, in addition to the parking and bus projects listed above. Bus handling capacity would be increased; traffic circulation problems would be addressed; and weather-sheltering, transit information displays and other patron amenities would be provided.

Funding for some of these projects may be sought by the appropriate local bus transit operator, however BART would be responsible for implementing these projects regardless of which agency might secure funding for them.

Index #	Site and FMS #	Bus Capacity
166	Daly City (11--)	11 (3 net new)
167	Richmond	10 (5 net new)
168	El Cerrito del Norte	13 (7 net new)
169	West Oakland	6 (4 net new)
170	Coliseum/Airport	10 (5 net new)
171	San Leandro	amenities only
172	BayFair (01MI)	18 (14 net new)
173	BayFair	amenities only
174	South Hayward	9 (7 net new)
175	Fremont	19 (3 net new)
176	Pleasant Hill	TBD*
	Total (gross)	**96 plus TBD***
	Total (net new)	**48 plus TBD***

* to be determined

Justification for projects:
These bus facility improvements are essential to accommodating service improvement being planned by connecting bus operators. Nine of the eleven projects would directly support AC Transit's Comprehensive Service Plan, currently being implemented and which will continue to bring more service to BART stations, as that plan now exists. The planned facility improvements would accommodate these higher levels of service. Additional patron comfort and convenience would be needed to attract patrons to such new capacity.

Traffic circulation problems and pedestrian/vehicle conflicts impair the operation of the access facilities at these stations, and create safety concerns. The planned separation of different modes of traffic, together with better channelization and protection of pedestrians, would address these problems.

The operations of AC Transit, CCCTA (County Connection), Santa Clara County Transit, San Francisco Muni, Samtrans, Vallejo Transit, and Benicia Transit would all benefit from implementation of these projects, as would the patrons who would use them.

177-182. STATION PARKING EXPANSION PROJECTS

Descriptions of projects:
These projects involve expansion of patron parking. Bus facility improvements for West Oakland, BayFair, and Pleasant Hill would be separate projects as listed above. Parking expansion would be provided in multi-level parking structures to be built in existing BART-owned surface parking lots in each case except West Oakland. At that station, land acquisition and additional surface parking are proposed.

Index #	Site and FMS #	Parking Capacity	
177	Rockridge (03EB)		(600 net new in a second deck)
178	MacArthur (07GH)	700	(500 net new)
179	Lake Merritt (01EE)	500	(400 net new)
180	West Oakland ((11EG)		(1,100 net new in a surface lot)
181	BayFair (01MH)	700	(500 net new)
182	Pleasant Hill (03NE)	1,550	(1,200 net new)
	Total (net)	**4,300**	

Justification for projects:
All of these stations experience severe patron access constraints. The parking fills early in the morning peak period, limiting access to the system later in the day when ample passenger-carrying capacity is available on trains. This negatively impacts potential patronage growth and fare revenue generation. These projects would help alleviate this constraint.

183-187. SUBURBAN TRANSIT CENTER-PARK/RIDE FACILITIES

Descriptions of projects:
The following projects would be intermodal facilities to accommodate safe, comfortable and convenient off-street auto-to-bus and bus-to-bus transfers in outlying suburban areas away from the existing BART system. With one exception, each project would include a landscaped parking lot, passenger waiting and bus loading areas (including weather-sheltering), transit information displays, telephone, and facility lighting. The project at Irvington would not include automobile parking, as parking capacity is available at Fremont Station and the facility would serve primarily to support AC Transit and possibly Santa Clara County Transit bus-to-bus transfers. With the exception of Brentwood and Alameda, all of these projects would be built on the sites of proposed extension rail stations.

Index #	Site and FMS #	Auto Capacity	Bus Capacity
183	Brentwood (04RA)	100	4
184	Alameda	TBD*	TBD*
185	Pittsburg (04IA)	175	4
186	Irvington	0	9
187	West Contra Costa (06KA)	TBD*	TBD*
	Totals	**275 plus TBD***	**17 plus TBD***

* to be determined

Justification for projects:
These projects would support local transit service and (except for Alameda and Irvington) limited-stop, freeway-oriented BART Express Bus service linking these areas with existing BART rail stations. This would make the transit option more attractive in high-growth outlying suburban areas, and therefore would contribute to transit patronage growth.

PRODUCTIVITY IMPROVEMENT PROJECTS

COMPUTERIZATION PROJECTS

188. PROJECT TRACKING SYSTEM
(65HE)

Project description:
Procure additional hardware and add and expand networks to provide all project managers access to the District's project tracking system (scheduling, budgeting, status reporting, etc.)

Project justification:
Management consultants have recommended, and UMTA is now requiring, an effective means of project scheduling and management. This project would enable managers to more accurately anticipate and resolve potential project delays and cost overruns due to scheduling and resource conflicts. The early resolution of such problems would support more timely and cost-effective project delivery.

189. TOWER DATA NETWORK

Project description:
Provide networked personal computers in each yard tower, yard transportation building, terminal zone, and the Operations Control Center to coordinate train and train operator scheduling, and provide a link to the transportation computer network. Software would provide the capability of maintaining train and train operator schedules during both normal and disrupted service periods.

Project justification:
By maximizing personnel scheduling efficiency, this project would allow the operation of additional trains without an increase in staffing levels. This project would automate and facilitate the critical tasks of tracking train lengths, car locations, and train operator assignments.

190. COMPUTER-AIDED DESIGN AND DRAFTING WORKSTATIONS

Project description:
Purchase and install seven computer-aided design and drafting (CADD) workstations.

Project justification:
All future District projects requiring technical drawings, including those being developed for the extensions, will be furnished to BART in CADD format. This will permit a reduction of about 50 percent in the time required to produce new drawings, the storage of drawings will be more efficient, and it will be easier to track drawings for configuration control purposes.

191. LEGAL DEPARTMENT WORDPROCESSING SYSTEM CHANGEOUT

Project description:
Replace the leased system with one consisting of a personal computer network which connects all attorneys, their support staff and the District Secretary's office.

Project justification:

The existing wordprocessing system was originally leased to support the Legal Department. It was subsequently upgraded and extended to the District Secretary's staff. It is now more cost effective to replace the leased system with a purchased personal computer network. These operating savings would amount to approximately $72,000 annually. The existing system only allows users to perform wordprocessing, whereas PC-based systems permit use of a wide variety of productivity enhancing application software. The existing equipment is no longer manufactured and support is increasingly difficult to obtain.

192. DISTRICTWIDE PERSONAL COMPUTER HARDWARE AND SOFTWARE

Project description:

This is the program that supplies personal computer hardware and software to District staff. This includes assistance with product selection, purchasing, installation, maintenance and local area networking.

Project justification:

Current service levels are well below user expectations, due to lack of funding. Approximately $2.6 million in requests for non-mainframe computer equipment and supplies is in backlog. Lack of this equipment creates significant obstacles to achieving higher productivity.

193. COMPLETE DISTRICTWIDE PERSONAL COMPUTER NETWORK

Project description:

Local area networks (LAN's) in the various departments will need to be connected or bridged after individual LAN's are established. This request is for additional servers and connecting devices which would integrate the District's local area networks.

Project justification:

The District currently has several local area networks (LAN) in operation and many requests for additional LAN's. These various LAN's must be bridged and/or connected in order to provide connectivity to all users throughout BART. Service levels would be increased, data would be more accessible to all participants, and productivity would be enhanced.

194. SIMULATOR REHOSTING
(60AE)

Project description:

Rehost the train operations simulator onto a UNIX server/workstation based system; develop BART staff capability to maintain and support the simulator through training and creation of software documentation; provide a support contract utilizing the current simulator contractor for the transition period; and provide VMS workstations to various user departments.

Project justification:

The simulator is an analysis tool developed over the last decade. It is currently being used to support Central Computer System testing, system performance studies, operational schedules evaluation, and extension planning and design work. There is a need for the simulator to meet BART operational, engineering, and extension requirements.

195. TRACTION POWER SIMULATOR

Project description:
Develop a personal-computer-hosted traction power simulator for modeling segments of the electrical system to check design and to run operational scenarios with substation equipment out of service. Project includes validation of model by comparison with system operation.

Project justification:
The simulator would allow BART to check designer work and to develop operational strategies for response to equipment outages.

196. ADAPTIVE DIAGNOSTIC SYSTEMS

Project description:
Investigate and develop adaptive diagnostic systems which can be used to facilitate the identification of system failures. The expectation is that these systems, forms of artificial intelligence, can be taught to recognize failure data patterns and associate them with the proper repair or adjustment action.

Project justification:
Success of this project would significantly reduce system repair/adjustment times as well as minimize erroneous failure diagnosis.

197. DEVELOPMENT OF SPECIAL-PURPOSE MICROPROCESSOR-BASED SYSTEMS

Project description:
Design and develop prototype microprocessor-based systems to enhance the efficiency, reliability, and/or productivity of District operations. Systems which would be developed could include a train operator remote control system, special-purpose test equipment, and automatic fare collection for patrons who must use the station service gates instead of faregates (such as wheelchair users and patrons with bicycles).

Project justification:
Much of the District's equipment uses obsolete components and design, has inflexible features, and is unreliable. Use of microprocessor-based systems would allow equipment to be upgraded at relatively low cost, with the prospect of improved reliability, more and better features, ease in service, and design flexibility. As important, such systems would also accommodate new services currently unattainable.

COMMUNICATIONS IMPROVEMENT PROJECTS

198. FIBER OPTIC NETWORK SYSTEMWIDE

Project description:
Design, furnish and install a systemwide fiber optic network. This system would provide a high speed, high capacity communication link between Central Control and all District wayside facilities, and spare fibers for future requirements.

Project justification:
The District's present communication link is near capacity in all stations. The extensions will use up the remaining capacity in the communication cables; there is no existing way to alleviate the problem. Voice and data requirements at each station are constantly growing. A fiber optic network would provide all communication requirements for the foreseeable future.

199. FIBER-OPTIC LINK BETWEEN CASH HANDLING BUILDING AND ADMINISTRATION BUILDING

Project description:
This project would establish a fiber-optic cable link between the Cash Handling Building and the Lake Merritt Administration Building for both video monitoring and data-communications.

Project justification:
The link is the next step in providing the means for remotely monitoring Cash Handling Building activities for security purposes, as well as providing the pathway for data-communications. Additionally, the fiber-optic cable may be used in the future to link the Oakland Shop to the Lake Merritt Administration Building.

200. ADD VOICEMAIL TO ADMINISTRATIVE BUILDINGS TELEPHONE SYSTEM

Project description:
Add voicemail capability to the AT&T Dimension switch which serves Lake Merritt, MetroCenter, and 25 Fourth Street buildings.

Project justification:
Thousands of hours of staff time are lost each month playing "telephone tag". Installing a voicemail system would reduce wasted time in the District's administrative headquarters buildings.

ADMINISTRATIVE FACILITIES IMPROVEMENT PROJECTS

201. NEW STAFF BREAK ROOMS AT STATIONS

Project description:
Build staff break rooms at Lake Merritt, Fruitvale, West Oakland, Daly City, Powell, MacArthur, Lafayette and Walnut Creek Stations. Currently these stations do not have break rooms where employees can take their contractually required breaks and lunches.

Project justification:
This project is required to accommodate the District's labor agreements specifying suitable break rooms for District employees. These facilities would be shared by various departments within the District.

202. EXPAND CASH HANDLING BUILDING

Project description:
Increase square footage at the Cash Handling Building.

Project justification:
Additional square footage is necessary to handle increased fare revenues.

203. MODIFY 25 FOURTH STREET BUILDING

Project description:
Modify the office areas at 25 Fourth Street for both the Training/Development Department and Stores to increase the office space available.

Project justification:
The modified area would accommodate the administrative needs of both Training/Development and Stores, as well as provide a needed breakroom for warehouse personnel. Current office space does not provide sufficient work area for employees who require offices. At present, the inefficient use of the floor space and the disruptive flow of traffic between Training and Stores administrative areas hinders efficient operations.

204. EMPLOYEE FITNESS CENTER

Project description:
Remodel facilities in the MetroCenter Administration Building basement to construct a locker room and employee fitness center.

Project justification:
A healthy work force contributes to more reliable and productive operation of the system by decreasing sick leave absences and improving productivity. A more alert and productive work force would provide a more efficient and safe service at decreased cost. Decreased absenteeism would be reflected in lower costs and increased safety as the use of overtime is diminished. Several health insurance carriers provide a percentage rebate of insurance premiums for insured employees of organizations that operate wellness programs.

OTHER PRODUCTIVITY IMPROVEMENT PROJECTS

205. TRAIN CONTROLLER TRAINING SIMULATOR

Project description:
Accommodate the increasing need for a system simulator that allows for training to take place without the utilization of the real rail system. Utilization of the real system for training purposes is both expensive in terms of instructor costs and inefficient as it relates to lost hours by students who often cannot train on the real system because of the negative impact on rail service.

Project justification:
A training simulator would save on lost time costs of students and instructors currently estimated to be 15 percent of the time that an individual is in training; provide for a more thorough training process, thereby increasing the efficiency for students completing the training; decrease the number of delay events for passengers that are attributable to training; provide a tool for certified controllers to maintain proficiency between scheduled recertification periods; and provide a badly needed diagnostic tool in the testing and development of BART emergency procedures.

206. AUTOMATED PARKING CONTROL SYSTEM

Project description:
Installation of parking control devices at eight District parking lots. The parking devices would discourage use of District parking facilities by non-patrons, accommodating better patron access to parking stalls.

Project justification:
District patrons continue to complain about abuse of patron parking at various stations by non-patrons. The present token system in Orinda and Lafayette is difficult to enforce. Tokens are stolen; patrons often insert tokens in the wrong slot and are unable to prove same; and individuals insert tokens into numerous slots, making it difficult to tell how much parking is occupied by non-patrons. This proposed parking control system would eliminate these problems and respond to community and patron concerns.

207. RETROFIT LIGHT FIXTURES AT PARKING LOTS

Project description:
Retrofit all 400 watt mercury vapor light fixtures with 250 watt high pressure sodium light fixtures at District parking lots.

Project justification:
High pressure sodium light fixtures produce more light per watt, saving over one-third of the electrical energy, resulting in operational savings.

208. MICROFILMING OF VITAL RECORDS

Project description:
Purchase microfilming equipment and microfilm approximately one million documents per year.

Project justification:
Documents are now preserved on paper. Due to the age of some of this paper, some documents are crumbling. Records may be lost if microfilming is not done.

SYSTEM EXTENSION PROJECTS

209. NEXT GENERATION CENTRAL COMPUTER SYSTEM

Project description:
Replace existing supervisory control and data acquisition computer systems. The systems include the Destination Sign System (DSS), the Data Acquisition System (DAS), the Train Information Monitor System (TIM), and the hardware and database platform for the Central Computer System (CCS).

Project justification:
The software development and increased computer capability provided by this project is required to provide necessary computer capacity for the District's Extensions Program. This Next Generation Project would use fault tolerant computers capable of supporting all four systems (DSS, DAS, TIM, CCS).

The Destination Sign System (DSS) is 20 years old, has not been manufactured for 15 years and cannot be modified or upgraded to accommodate new requirements imposed by the extension stations and proposed operating plans. The sign heads are no longer economically feasible to maintain or replace in kind. The extensions will require a make/break train capability which cannot be accommodated by the existing destination signs.

The Data Acquisition System (DAS) also runs on 20 year old computers that are beyond their economic life, cannot be modified to add the required functionality, and are no longer manufactured. Current system reliability and availability is extremely poor. This is negatively affecting the District's ability to provide timely, accurate data. The replacement would assure an open-ended system to accommodate the extensions program and future District requirements under consideration.

The Train Information Monitor (TIM) system is an information display system available to patrons in the faregate area. It is currently being demonstrated in a limited manner at two stations and is planned to be installed in all stations.

This project would provide for all of these applications to reside on a common fault tolerant computer platform at Central and in each station. This would reduce the required total number of BART control computers by more than 60 percent. Fault tolerant hardware eliminates acute maintenance requirements usually associated with mission-critical applications on conventional type computer systems. Computer spare parts are a part of the basic fault tolerant equipment's "pairs and spares" design and need not be supplemented with a separate inventory. Hardware component failures that do occur are identified by the system and the defective components are bypassed automatically utilizing the "internal spares". Automatic alarms identify the failures to system monitors, hardware error logs and to the manufacturer's service center in real time providing for the automatic dispatch of replacement parts via next day delivery. The planned design would eliminate most single points of failure.

210. NEW SYSTEMWIDE RADIO NETWORK
(27XX)

Project description:
Design, furnish, and install a trunked radio network systemwide, replacing the radio equipment presently in service.

Project justification:
The present radio system is completely inadequate to serve the needs of the planned system extensions. A trunked system provides ample capacity and coverage to meet all present and foreseeable radio communication needs.

211. M-LINE TRACTION POWER IMPROVEMENTS

Project description:
Add low-resistance contact rail and additional substation and gap-breaker capacity at several locations on the M-line.

Project Justification:
Engineering studies show that the electrification system must be improved to satisfy voltage criteria for train operation at future service levels with the system extensions. Additional trains at closer headways result in unacceptably low contact-rail voltage under normal and contingency conditions.

212. C-LINE TRACTION POWER IMPROVEMENTS

Project Description:
Add two new substations and larger 34.5KV cables and lower resistance of contact rail at several locations on the C-line.

Project Justification:
Engineering studies show that the electrification system must be improved to satisfy voltage criteria for train operation at future service levels with the system extensions. Additional trains at closer headways result in unacceptably low contact-rail voltage under normal and contingency conditions.

213. A-LINE TRACTION POWER IMPROVEMENTS

Project description:
Add six new substations along the northern part of the A-line, lower resistance of contact rail, and change PG&E supply transformer at Watson Avenue switching station to one of higher capacity.

Project Justification:
Engineering studies show that the electrification system must be improved to satisfy voltage criteria for train operation at future service levels with the system extensions. Additional trains at closer headways result in unacceptably low contact-rail voltage under normal and contingency conditions.

214. A-LINE TRAIN CONTROL RESIGNALING

Project description:
Resignal the A-Line between BayFair Station and the Oakland Wye, to include changes to the interlocking in the Wye. The project includes the design, procurement, installation and testing of train control equipment.

Project justification:
This project is required to provide for operation of trains on a 2 minute 15 second scheduled headway so that trains operating on the Dublin-Pleasanton Extension can merge with the existing train service.

215. NEW TRAIN OPERATOR REPORTING LOCATION AT MACARTHUR STATION

Project description:
Remodel existing facilities at MacArthur Station to make them suitable as a train operator reporting location to support operation of the Dublin-Pleasanton Extension.

Project justification:
Current planning indicates that MacArthur Station may be a terminus service on the new Dublin-Pleasanton Line. In support of this objective, MacArthur Station must accommodate a reporting location for train operators in order to avoid personnel travel time to and from an existing yard.

216. TRAIN IDENTIFICATION SYSTEM ENHANCEMENT

Project description:
Increase the number of destination bits in the train identification codes. It involves replacing the Automatic Train Operations (ATO) circuitry in the station with microprocessors. The project would modify the vehicles after the stations are completed.

Project justification:
There are not enough bits in the existing train identification code for the new destinations required by extensions. The advantages of using microprocessors in the stations are that the existing equipment is old and many replacement parts are no longer made, and microprocessors would be able to process both modified and unmodified cars. The existing equipment cannot do this.

217. EXTENSIONS TRANSIT VEHICLES
(42DA)

Project description:
Procure additional transit vehicles.

Project justification:
Bringing the system extensions on line will require additional transit vehicles. This procurement is planned for 50 cars with an option to procure an additional 200 cars to support all extensions scheduled for opening through 1998.

218. DUBLIN-PLEASANTON EXTENSION

The Dublin-Pleasanton Extension would consist of approximately 12 miles of double track, branching off from the Fremont Line near BayFair Station, running primarily in the Route 238 and I-580 corridors. There will be either two or three stations, with approximately 5,600 automobile parking spaces. Stations will be in (1) Castro Valley at Redwood Road, (2) in west Dublin and Pleasanton between Foothill Road/San Ramon Boulevard and I-580 and/or (3) in east Dublin and Pleasanton between Hopyard Road/Dougherty Road and Santa Rita Road/Tassajara Road.

219. LIVERMORE EXTENSION

This project would extend the eastern Alameda line further to the east in the I-580 corridor, with stations in west and east Livermore, and a rail vehicle yard in east Livermore.

220. WEST PITTSBURG EXTENSION

The West Pittsburg Extension would consist of approximately eight miles of double track, extending from Concord Station, running primarily in the Port Chicago Highway and Route 4 corridors. There will be two stations, with approximately 3,500 automobile parking spaces. Stations will be in North Concord along Port Chicago Highway, and in West Pittsburg at Route 4 and Bailey Road.

221. ANTIOCH EXTENSION

This project would extend the eastern Contra Costa line further east in the Route 4 corridor, with stations in Pittsburg and in west and east Antioch, and a rail vehicle yard in east Antioch.

222. WARM SPRINGS EXTENSION

The Warm Springs Extension would consist of approximately five miles of double track, extending south from Fremont Station into the Irvington and Warm Springs districts of Fremont, with a station in each community with approximately 3,300 automobile parking spaces. The Warm Springs Extension environmental impact study currently underway will also evaluate a further extension to a third station in South Warm Springs.

223. SOUTH BAY EXTENSION

This project would extend the southern Alameda County line further south through Milpitas to San Jose and Santa Clara.

224. COLMA EXTENSION

The Colma Extension would consist of approximately one mile of double track, extending south from the Daly City Station tailtrack, in the I-280 corridor to a station in the community of Colma.

225. SAN FRANCISCO AIRPORT EXTENSION

This project would extend the Daly City/Colma line, with three or four stations and approximately six to seven miles of double track, to the vicinity of San Francisco International Airport. The alignment of the extension and the number and location of stations is currently under evaluation in the San Francisco Airport Extension Alternatives Analysis Study.

226. MENLO PARK/PALO ALTO EXTENSION

This project would extend approximately 15 miles south from San Francisco Airport, with multiple stations, in the Southern Pacific mainline corridor.

227. MENLO PARK/PALO ALTO TO SANTA CLARA EXTENSION

This project would extend approximately 16 miles, with multiple stations, to connect the Menlo Park/Palo Alto Extension with the San Jose/Santa Clara Extension.

228. SAN FRANCISCO MUNI PROJECT

This project would be implemented by the San Francisco Municipal Railway, using funds contributed by BART.

BART EXTENSION STAGING POLICY [1]

PHASE	INSIDE CURRENT DISTRICT OR UNDER FUNDING AGREEMENTS
I.	North Concord-West Pittsburg [2]
	Irvington-Warm Springs [8]
	Castro Valley - Dublin [3,8]
	MUNI Metro Extension Project [4]
	Colma-Tanforan-San Francisco Airport [5]
II.	Pittsburg-West Antioch-East Antioch
	Pleasanton-West Livermore-East Livermore [3]
	San Francisco [6]
	San Pablo-Hilltop
	Oakland Airport Connector [7]
III.	San Francisco [6]
	Pinole-Hercules/Rodeo-Crockett
	San Ramon Corridor

NOTES:

1. The several segments shown under each Roman numeral are understood to be implemented concurrently, to the extent that funding is available. BART will be the operator for any new heavy or light rail transit starts or extensions within the three BART counties.
2. To be extended east beyond West Pittsburg as funding permits, per SB 1715 of 1988.
3. Third station may be constructed only with funds additional to those identified in MTC Resolution 1876 (as revised in 1989).
4. The San Francisco Project is identified through coordination with the City and County of San Francisco as the MUNI Metro Extension to the CALTRAIN Depot South of Market.
5. Agreement of February 28, 1990 with SamTrans to proceed with SFO extension, subject to BART project approval.
6. Specific San Francisco Project to be identified through coordination with the City and County of San Francisco. Section 29034.5 of the California Public Utilities Code lists an extension of District services and facilities to the northwest section of the City and County of San Francisco as a District service commitment.
7. A people-mover, or some other mode of travel, to the Oakland Airport to be established before or at the same time as an extension of BART to the San Francisco Airport.
8. Funding from Proposition 116 shall not be allocated to the Warm Springs Extension (WSX) until funding for the Dublin-Pleasanton Extension has been guaranteed.

PHASE	OUTSIDE CURRENT DISTRICT [9]
I.	Milpitas
II.	Millbrae-Menlo Park
	Milpitas-San Jose
III.	Menlo Park-San Jose

9. Subject to a satisfactory cost-sharing arrangement with San Mateo and Santa Clara Counties and project approval by BART. Pursuant to Section 29034.5 of the California Public Utilities Code, only non-District funds may be spent by the District for the purpose of extending services and facilities outside of District's January 1, 1971 boundaries until the District meets specified service commitments within the 1971 boundaries.

229. WEST CONTRA COSTA COUNTY EXTENSION

This project would extend the Richmond Line further north, generally in the I-80 corridor, terminating in the vicinity of Crockett.

230. SAN RAMON CORRIDOR EXTENSION

This project would provide a rail link between Pleasant Hill-Walnut Creek in the north and Dublin-Pleasanton in the south.

231. OAKLAND AIRPORT CONNECTOR PROJECT

This project would provide a fixed-guideway link between Coliseum-Oakland Airport Station and the Oakland Airport passenger terminals.

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